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DEPARTEMENT VAN LANDBOUW, NIJVERHEID EN HANDEL

Buitenzorg, Java „'S LANDS PLANTENTUIN"
(„JARDIN BOTANIQUE DE BUITENZORG")

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REVISION OF THE VERBENACEAE.

OF THE DUTCH EAST-INDIES AND SURROUNDING COUNTRIES

BY

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Introduction.

The dissertation of the first-named author [1]) published the results of his investigations on the collections of the Verbenaceae extant in the Herbaria of Leiden, Utrecht and Berlin. On occount of the war the material from the Buitenzorg-Herbarium could not be obtained. Upon arriving at Buitenzorg the first-named author was glad of the opportunity to complete his work there. He found, however, that the second-named author, wholly independently, had also worked on the same family for a considerable time. Because our methods are rather different, we have had some trouble in reaching a satisfactory agreement for combining our work in order to publish a new revision of the order, based upon Buitenzorg material. Though we could not find an entirely satisfactory solution of the matter, yet we thought it best not to resign and have finally concluded that each of us should revise a certain part of the order, for which he will take the full responsibility. For this purpose, the natural order was divided in the following way: the first-named author has elaborated the genera: *Verbena*, *Lantana*, *Lippia*, *Stachytarpheta*, *Petraea*, *Duranta*, *Schizopremna*, *Tectona*, *Xerocarpa*, *Premna*, *Pygmaeopremna*, *Viticipremna*, *Vitex*, *Faradaya*, *Hosea*, *Holmskjoeldia*, *Peronema*, *Petraeovitex*, *Symphorema*, and *Sphenodesme*, whilst the second author reviewed the genera: *Priva*, *Geunsia*, *Callicarpa*, *Teysmanniodendron*, *Gmelina*, *Clerodendron*, *Congea* and *Avicennia*.

It must be said with emphasis, however, that while this revision is published jointly it does not imply that each of us agrees in all respects with the work of the other, and though we endeavoured to do so a certain individuality will sometimes prevent the uniformity desired. The part, taken therefore, by the first-named author, from the nature of the matter is more or less, a supplement the corresponding part of his dissertation (in the following cited as „Verb.")

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[1]) H. J. Lam. The Verbenaceae of the Malayan Archipelago, together with those from the Malayan Peninsula, Philippines, the Bismarck-Archipelago and the Palau—Marianne—and Caroline- islands.—Groningen, March 31st. 1919.

For the sake of completeness the revision contains all the species which occur in the regions cited, together with their synonymy and the keys for determination.

About our opinion in the matter of varieties, see Verb. 2.

Key of the genera (auctore H. J. L.)

1. a. Fertile stamens 2 2
b. Fertile stamens 4 3
c. Fertile stamens 5 or more 26
2. a. Leaves simple; undershrubs . . . . . **4. Stachytarpheta.**
b. Leaves pinnately composed, with winged rhachis; trees **20. Peronema.**
3. a. Inflorescence capitate, spicate or racemose 4
b. Inflorescence cymose or flowers axillary in the axils of leaves . . . 11
4. a. Inflorescence racemose, axillary; climbing shrubs or trees. **6. Petraea.**
b. Inflorescence spicate; erect shrubs or undershrubs 5
c. Inflorescence capitate; trees or climbing shrubs. 10
5 a. Fruits drupaceous, with fleshy exocarp. 6
b. Fruits capsular, with leathery or dry exocarp. 7
6 a. Inflorescenses elongated. Drupes with 4 or by abortion 2 pyrenes; pyrenes 2-celled, 2 seeded. . . . . . . **7. Duranta.**
b. Spikes short-spicate. Drupes one 2-seeded or two 1-seeded pyrenes **2. Lantana.**
7 a. Ovules apically attached. Fruits bivalvate, by abortion 1-seeded **25. Avicennia.**
b. Ovules basal. Fruits more-seeded, splitting in 2-4 pyrenes. 8
8 a. Fruits with four 1-seeded cells or pyrenes (cocci) . . . **1. Verbena.**
b. Fruits with 2 (or by abortion 1) pyrenes 9
9 a. Pyrenes 2-celled, 2-seeded . . . . . . **5. Priva.**
b. Pyrenes 1-celled, 1-seeded . . . . . . **4. Stachytarpheta.**
10 a. Heads with 3-4 involucral bracts; climbing shrubs . . **23. Congea.**
b. Heads without involucral bracts; trees in the mangrove-formation . . . . . . **25. Avicennia.**
11 a. Inflorescences terminal, often composed, the small inflorescences beeing sometimes attached at rather large intervals 12
b. Inflorescences axillary, simple, or flowers solitary in the axils of the leaves 21
12 a. Flowers small, 0.5-1 c.M. long; corolla-tube short, relatively rather broad, cylindrical or nearly so 13
b. Flowers larger, 1.5-12 c.M. long; corolla-tube long, relatively rather narrow, at least at the base, cylindrical or infundibuliform and widened near the throat . 19
13 a. Leaves composed 14
b. Leaves simple 17
14 a. Calyx not enlarged in fruit 15
b. Calyx with enlarged, membranous lobes in fruit . **21. Petraeovitex.**
15 a. Corolla 4-merous . . . . . . **13. Viticipremna**
b. Corolla 5-merous 16
16 a. Fruit capsular, indehiscent, 1-celled, 1-seeded, large; petioles more or less winged, at least when young . . . . **10. Teysmanniodendron.**
b. Fruit drupaceous with one 4-celled pyrene, small . . . **14. Vitex.**
17 a. Corolla 4-merous . . . . . . **12. Premna.**
b. Corolla 5-merous 18
18 a. Calyx unaltered in fruit . . . . . . **14. Vitex.**
b. Calyx with enlarged, membranous lobes in fruit. **Petraeovitex bambusetorum.**

19 a. Calyx closed at first, 2-3- lobed afterwards . . . . **16. Faradaya.**
b. Calyx 3-5- merous from the beginning 20
20 a. Corolla-tube relatively long, cylindrical; stamens indistinctly didynamous, usually long exserted; fruit drupaceous with 4 pyrenes **18. Clerodendron**
b. Corolla-tube funnel-shaped, very wide across the throat; stamens very distinctly didynamous, little exserted or included; fruit drupaceous with one 1-4- celled pyrene . . . . **15. Gmelina.**
21 a. Inflorescences axillary 22
b. Flowers solitary in the axils of the leaves . . **Gmelina uniflora.**
22 a. Calyx 2-3- lobed when adult, large 23
b. Calyx small, regularly 4-5- toothed . . . . . . **8. Callicarpa.**
c. Calyx indistinctly 5- lobed or undulate, nearly circular, spreading, coloured . . . . **19. Holmskjoeldia**
d. Calyx regularly or irregularly 5- toothed 24
23 a. Corolla-lobes subequal; pyrenes 3-4 . . . . . . **16. Faradaya.**
b. Corolla-lobes unequal, 3 obovate, 1. linear; pyrenes 1-2 . . **17. Hosea.**
24 a. Calyx unaltered in fruit 25
b. Calyx with enlarged, membranous lobes in fruit . **21. Petraeovitex.**
25 a. Corolla-tube short, 0.3-1 cM.; limb 2- lipped . . . . . **14. Vitex.**
b. Corolla-tube longer, cylindrical, slender, 0.5-12 cM.; limb often subregularly 5- lobed . . . . **18. Clerodendron.**
26 a. Inflorescences capitate, with involucral bracts 27
b. Inflorescences cymose or spicately racemose 28
27 a. Flowers 5- merous . . . . **23. Sphenodesme.**
b. Flowers 6-18- merous . . . . **22. Sijmphorema.**
28 a. Inflorescences terminal, composed 29
b. Inflorescences axillary, simple . . . . **8. Callicarpa.**
29. a. Inflorescences cymose, panicled . . . . **9 Tectona.**
b. Inflorescences racemose, subspicate, brachiate near the base. **11 Xerocarpa.**

1. VERBENA L. (auctore H. J. L.).

Syst. Veg. ed. I (1737); Verb. 9.

Distribution: chiefly in tropical America, very few species in the old world, one cosmopolitical for tropical and temporate regions.

a. Corolla blue, 0.6 c.M.; leaves oblong-lanceolate, 5-10 c.M. . **1. V. officinalis.**
b. Corolla red-violed, 0.35 c.M.; leaves narrowly lanceolate, $7\frac{1}{2}$-$13\frac{1}{2}$ by 0.8-3 c.M. . . . . **2. V. bonariensis.**

1. **Verbena officinalis** L. Sp. Pl. 29 (1753); Verb. 10.

Distribution: Cosmopolitical for tropics and subtropics.

2. **Verbena bonariensis** L. Sp. Pl. 28 (1753); SCHAUER, DC., Prodr. XI, 541; ID in MARTIUS, Fl. Bras. IX, 189—A herb, $\frac{1}{2}$--$2\frac{1}{2}$ M. high; branchlets acutely quadrangular, sparsely pubescent, as is inflorescence, the ribs more densely pubescent; leaves sessile, opposite, in one pair together amplexicaulous, the pairs decussate; lanceolate, apex acuminate, margins irregularly serrate, the serrulations often sublanceolate; both surfaces, especially the upper one hirsutely hairy; nerves indistinct, in about 5 pairs; $7\frac{1}{2}$--$13\frac{1}{2}$ by 0.8-3 c.M.; inflorescences spicate, the spikes on long and slender, opposite peduncles, forming together a lax terminal panicle; spikes cylindrical, 1-$2\frac{1}{2}$-5 c.M. long, longer in fruit, 0.5 c.M. in diam.; bracts of the inflorescence lanceolate, acuminate, violet, $1\frac{1}{2}$-$2\frac{1}{2}$ by 0.2-0.3 c.M.; bracts

in the spikes lanceolate acuminate, 0.35 c.M. long, 0.1 c.M. broad; calyx ovoid, 2- lipped, the lips minutely 2- toothed; 0,25-0.3 c.M., the lips 0.1-0.15 c.M.; pubescent without; pedicels very short or none; corolla red-violet, 0.35 cM., tube cylindrical, slightly curved, puberulous for the upper half; limb oblique, 5- lobed, pubescent without; seeds 0.1 c.M. long, glabrous, granulated on the inner side.

JAVA: BACKER n. 25103, Besuki, along the roads and on dry grounds.

Distribution: tropical America.

2. LANTANA L. (auctore H. J. L.).

Gen. Pl. ed. I. 185 (1737).; Verb. 10.

Distribution: chiefly in tropical America, a few in Africa and Asia.

1\. a. Leaves ternate or opposite; branchlets without spines; bracts with a long spiny acumen . . . . **1. L. trifolia.**

b. Leaves opposite; branchlets with or without spines; bracts without spiny acumen. 2.

2\. a. Branchlets often with spines; bracts as long as the half of the corolla-tube; calyx 2- lipped, lips 2- toothed; corolla goldenyellow, ultimately orange-coloured -red. . . . . **2. L. aculeata.**

b. Branchlets without spines; bracts as long as the corolla-tube; calyx 2- lipped, lips entire; corolla white with yellow throat . . . . **3. L. salvifolia.**

1\. **Lantana trifolia** L. Sp. Pl. 626 (1753); Verb. 11.— *L. indica* WALL. Cat. n. 1823 (1828)— Leaves rarely quaternately whorled, $6^{1}/_{2}$-10 by $3^{1}/_{2}$-4 c.M.; spikes subglobose at first, $1^{1}/_{2}$ by 1 c.M., cylindrical afterwards, $2^{1}/_{2}$-5 c.M. long; peduncles 5-10 c.M.; bracts 0.5-1 by 0.2-0.3 c.M.; calyx pubescent; corolla 0.6-0.8 c.M., tube 0.5-0.65 c.M., lilac or reddish, rarely white (BACKER n. 5795, Java); fruit 0.2 by 0.15 c.M., bright-red or -lilac.

In Herb. Bog. also from:

W.-and Central-Java!, Batu- Isl!, Medan!, Amboyna!, reaching an altitude of 1000 M.

Native names: Pujengang, Singgaŋan, Besarran, (all of them j.).

Distribution: tropical America, imported into tropical Asia.

2\. **Lantana aculeata** L. Sp. Pl. 627 (1753); Verb. 12—; *L. Camara L.* l.c.—*L. triplinervia.* TURCZ. Bull. Soc. Nat. Mosc. XXXVI, II, 205 (1863).

Of this very polymorphous species, several distinct forms seem to occur. The most common form is a small shrub, reaching a height of $1^{1}/_{2}$ and a breadth of 2 M. Its inflorescences have a diameter of 2—$2^{1}/_{2}$ cM., whilst the colour of the flowers varies from bright yellow and orange to dark-red. We found, however, in the mountains N. W. of Gadok, N. of Mt. Gedeh, W.-Java, a form of larger size ($2^{1}/_{2}$ M. in height, 3—4 M, in diam.), with larger inflorescences (3—4 cM. in diam.) and larger flowers, the colour of which was white or very pale rose with a white or pale-yellow throat. The limb of the corolla was 0.7—0.9 cM. in diam. (in the common form 0.4—0.5 cM.), the stems spinous. According to an oral communication by Mr. BACKER more forms of this species occur in Java, all of them more or less constant. Concerning this we may refer to his paper about *Lantana* in „De Tropische Natuur", II, 27 and 33 (1913), where details are given.

Probably *L. aculeata* originally is not a single species, but a group of several hybrids.

In Herb. Bog. also from:

Siam!, Sumatra!, Banka!, Madura!, Amboyna!, W.-India!, Mexico!, reaching an altitude of nearly 2000 M.

Native names: Saliara or Reba (s.), Waung (j.), Tjenté (m.).

Distribution: as the preceding species.

3. **Lantana salvifolia** JACQ. Hort Schoenbr. III, 18, t. 285 (1798); Verb. 13.—*L. indica* ROXB. Fl. ind. III, 89 (1832).—

In Herb. Bog. also from: Abessynia!

Distribution: as the preceding species, but also in tropical Africa.

3. LIPPIA L. (auctore H. J. L.)

Gen. Pl. ed. I, 347 (1737); Verb. 15.

Distribution: chiefly in tropical America; some species in Africa and some in Asia; one cosmopolitical in tropics and subtropics.

1 a. Peduncles shorter than the leaves. 2
b. Peduncles longer than the leaves, 5-11 cM.; leaves small, with rounded apex, subsessile, base attenuate, reaching 4 by 2 cM. . . . **1. L. nodiflora.**
2 a. Leaves ovate; bracts ovate, long cuspidate-acuminate, somewhat shorter than the corolla-tube; corolla pink. . . . . **2. L. geminata.**
b. Leaves lanceolate; bracts rhomboid or nearly circular, abruptly acuminate or apiculate, as long as the corolla-tube; corolla white . . **3. L. asperifolia.**

1. **Lippia nodiflora** RICH. Fl. bor. Am. II. 15 (1803); Verb. 16— Flowers lilac, light-rose to nearly white.

Var α **sarmentosa** SCHAUER, DC. Prodr. XI, 585, (1847).—*Lantana sarmentosa* SPR. Syst, II, 752, (1825—28).—*Lippia sarmentosa* SPR. l. c.-

In Herb. Bog. also from:

Java!, Madura!, Simalur!, Celebes!, Amboyna!.

Var β **repens** SCHAUER l. c. 586.—*Lantana repens* SPR. l. c.—*Lippia repens* SPR. l. c.—

In Herb. Bog. also from:

Java!, Timor!, Philippines!, Siam!, Assam!, Queensland!, Mexico!

Distribution of the species: cosmopolitical in tropics and subtropics. The leaves of the variety β sometimes reach a breadth of 2.4 cM.

2. **Lippia geminata** KUNTH in H. B. et K., Nov. Gen. et Spec. Pl. II, 266 (1817).

Distribution tropical America, imported into tropical Asia; also into Java?

3. **Lippia asperifolia** RICH. Cat. Hort. Med. Par. 67 (year?) *L. javanica* SPR.. Syst. Veg. II, 752 (1825).

Distribution: tropical America, S.-Africa, Java Koorders).

4. STACHYTARPHETA VAHL. (auctore H. J. L.)

Enum I. 205 (1855); Verb. 19.

Distribution: chiefly in tropical America, a few in Africa, imported into tropical Asia and run wild there.

1 a. Plant densely hairy; leaves 7½-12½ by 4-6½ cM.; petioles 2-4½ cM.; pairs of nerves 6-8; calyx 1-1.2 cM.; corolla 2½ cM., pink **1. S. mutabilis.**
b. Plant subglabrous; leaves 3-10 by 1-5 cM.; petioles ½-3½ cM.; calyx 0.6-0.75 cM.; corolla 0.7-1 cM.; blue 2

2. a. Spikes curved downward, flowers white or very pale blue; bracts very narrow, 0.025 cM. broad; calyx 0.45 cM., corolla-tube 0.5 cM. long,-limb 0.2-0.25 cM. in diam.; stamens inserted in the throat . . . . 2. **S. dichotoma.**

b. Spikes erect, flowers dark-blue with whitish throat; bracts 0.1-0.175 cM, broad; calyx 0.6 cM., corolla-tube 0.8-1.3 cM. long,-limb 0.3-0.5 cM. in diam.; stamens inserted in the middle of the corolla-tube . . . . 3. **S. jamaicensis.**

1. **Stachytarpheta mutabilis** (JACQ.) VAHL, Enum., I, 209 (1805); Verb. 20.— Leaves bullate; spikes 0.5-0.6 cM. in diam.; bracts 0.9-1 by 0.15-0.175 cM.; calyx 0.9-1.3 cM.; corolla 1.7-2$^1/_2$ cM.,- limb 1 cM. in diam.

Java: EDELING, Batavia flowering in March 1863. [1]).—Celebes: KOORDERS n. 19539 β, Menado, flowers on 25-XII-1894; native name: Rumput puti.—Ternate: SMITH 603.

A hybrid with *S. jamaicensis* has heen discovered by BACKER (Gunung Bunder, W.-Java, 1909, crescit inter parentes, unica).

Distribution: tropical America, imported into tropical Asia and Africa.

S. bogoriensis Z. et M.; Verb. 21.- It is very probable that this species is indentical with *S. jamaicensis* VAHL, *var.* β *indica* H. J. L. The specimen „ZOLLINGER n. 849" is not present in the Herb. Bog.

2. **Stachytarpheta dichotoma** VAHL, Enum., I, 207 (1805); Verb. 21.— A herb, reaching ± 60 cM. in height, with a rather compressed habit; leaves small, little bullate, usually 3-4 by 1.7-2.3 cM., sometimes reaching 10 by 4 cM.; the basal narrowing 0.8-1 cM. long; apex obtuse or rounded; spikes 10-20 (-30) cM., gracile, usually curved downward; flowers white or very pale blue; bracts almost linear, very narrowly acuminate, 0.45 by 0.025 cM.; calyx with 4 larger teethlets on one and 1 smaller in the sinus of the opposite side, 0.45 cM. long, 5-ribbed; corolla 0.5 cM. long, limb 0.2-0.25 cM. in diam.; stamens inserted in the throat.

In Herb. Bog. only from: Java!

Distribution: tropical America, imported into tropical Asia.

3. **Stachytarpheta jamaicensis** VAHL, Enum. I, 206 (1805); Verb. 22.— A robust herb or undershrub, reaching 2 M. in height; spikes stout, long; bracts lanceolate or ovate-lanceolate, the margins membranous; long acuminate; calyx with 4 acute teeth on one side, the opposite side with an acute sinus, 0.6 cM.; corolla dark-blue with whitish throat, rarely white (BACKER n. 1149 bis, Bantam, between Rangkas-Bitung and Tjilibis, W.-Java); limb 0.3-0.5 cM. in diam.; stamens at about the middle or in the upper part of the corolla-tube.

Var. α **typica** H. J. L., nov. var.— Folia bullata, ovata, basi integra, ± abrupte angustata; apice acuta, marginibus grosse acuteque serrata; 5-9$^1/_2$ cM. longa, 2.7-5 cM. lata, petiolo $^1/_2$-1.6 cM. longo; bracteae lanceolato-acuminatae, 0.5 cM. longae, 0.1 cM. latae.

In Herb. Bog. also from:

Java!, Madura!, Sumatra!, Amboyna!, New-Caledonia!, Philippines!, Caroline-Isl!, up to 1600 M. of altitude.

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[1]) This is probably the oldest record of the occurrence of this species in Java.

Native names: Djarong (s.), Sekar-laru, Karoménal, Biron (j.).

Var. β **Indica** H. J. L., nov. var.—*S. indica* VAHL, Enum. I, 206 (1805); for bibliography see Verb. p. 22.—*S. marginata* VAHL, l. c, 207.—*S. villosa* TURCZ. Bull. Soc. Nat. Mosc. XXXVI, II 197 (1863).—Folia ovata, minus bullata, basi integra, attenuata, in petiolum brevem decurrentia, 3-5 (-10) cM. longa, $1^1/_2$ cM.- $2^1/_2$ ($-4^1/_2$) cM. lata, petiolo 0 ($-2^1/_2$) cM. longo; bracteae ovatae, acuminatae, 0.4 cM. longae, 0.175 cM. latae.

In Herb. Bog. also from:

Java!, Sumatra!, Celebes!, Batu-isl!, Banka!, Madura!, British India!, reaching an altitude of 1200 M.

Native names: Djarong (s.), Ngadi-renggo (j.).

Distribution of the species: tropical America, Polynesia, tropical Asia and Africa.

We think *S. indica* is a form of *S. jamaicensis*, risen from the latter species after its importation into the old world. This seems more probable to us than the supposition of the importation of two several species.

5. PRIVA ADANS. (auctore BAKH.)

Fam. II (1763) p. 505; Verb. 23.—*Verbena* SP. L (?) Gen. Plant Ed. 2 (1742) p. 12; (?) L Gen. Plant, Ed. 6 (1764) p. 14; Jacq. Obs. Bot. Icon. I (1764-1771) p. 37 t 24.—*Tamonea* AUBL. Hist. Plant. II (1775) p. 659; JUSS. Gen. Plant. (1791) p. 122.—*Blairia* HOUST ex L. Gen. Plant. Ed. 2 (1742) p. 12 sub Verbena; GAERTN. Fruct. Sem. Plant. I (1788) p. 265 t 56. f. 1.—*Zapania* LAM. Tabl. Enc. Méth. Bot. I (1791) p. 59.—*Phryma* FORSK. (not of LINN., nor of LAM.) Flor. Aegypt. Arab. (1775) p. CXV (nom. nud.) fide VAHL. Symb. Bot. Plant. III (1794) p. 6 sub *Verbena Forskalaei* VAHL;—*Streptium* ROXB. Plant. Corom. II (1798) p. 25; Roxb. Flor. Ind. III (1832) p. 90.—*Tortula* ROXB. ex WILLD. Spec. Plant. III (1800) p. 359.—*Castelia* CAV. in Anal. Cienc. Nat. III (1801) p. 134 et Icon. 6p. 60 t 583.—*Pitraea* TURCZ. in Bull. Soc. Nat. Mosc. XXXV. II (1862) p. 328.—*Phelloderma* MIERS. in Trans. Linn. Soc. XXVII (1870) p. 100 t. 27.— *Burseria* LOEFL. It. Hisp. (1753) p. 194.;

Distribution: Tropical Amerika, Africa, Arabia and India.

1. **Priva lappulacea** (JACQ.) PERS. Syn. Plant. II (1807) p. 139.; LAM. Enc. Méth. Bot. Suppl. IV (1816) p. 554; POIR. in LAM. Enc. Méth. Bot. Suppl. V p. 282 sub *Tomonea*.—*Priva echinata* JUSS. Ann. Mus. Par. VII (1806) p. 70.—*P. mexicana* SIEBER. ex STEUD, Nom. Bot. II Ed. 2 (1821) p, 397.—*P. lamiifolia* MART. ET GAL. in Bull. Acad. Brux. XI 2 (1842) p. 325.—(?) *Verbena lappulacea* L. Spec. Plant. I (1753) p. 19; LINN. Spec. Plant. Ed. 2. I (1762) p. 28.—*Verbena lappulacea* JACQ. Observ. Bot. I (1764) p. 37 tab. 24.—*Verbena* foliis cordato-ovatis floribus spicatis, calicibus inflatis, seminibus echinatis, BROWN. Hist. Nat. Jamaic. (1756) p. 116.—*Scorodonia* floribus spicatis, purpurascentibus, pentapetaloidibus, SLOAN. Hist. Plant. Jamaic. I (1707) p. 174. tab. 110 fig. 1. ex LINN. ET JACQ. in Synon. sub *Verbena lappulacea*;—*Blairia* HOUST. Amm. Herb. 277 ex LINN. ex JACQ. in syn. sub. *Verbenia lappulacea*.—*Burseria* LOEFL. Iter. Hisp.

(1758) p. 194; ex JACQ. in syn.— *Zapania lappulacea* LAM. Tabl. Enc. Méth. Bot. I (1791) p. 59. — *Tamonea lappulacea* (L.) POIR. Enc. Méth. Bot. VII (1805) p. 568. — *Blairia lappulacea* HOUST. ex STEUD. Nom. Bot. I Ed. 2 (1840) p. 208. —

Java: Bantoer, Res. Pasoeroean (DEN BERGER No. 792; BACKER No. 30487).

Distribution: Trop. America and W—India.—Accidentally introduced in Java.

Note: LINNAEUS in his Spec. Plant. I (1753) p. 19 has classified the *Verbena lappulacea* L. under the *Diandrae*, however, in the second edition he says „diandra?". Evidently he did not see the plant at all, or he saw only a defective specimen. JACQUIN first, in his Obs. Bot. (1764) p. 37, perceived rightly: „stamina perpetuo quatuor adsunt." According to this, L's author's-name must be rejected. In spite of the wrong classification by LINN., in this case it is almost sure, that both authors have meant the same plant, because they quote the same synonyms.

6. PETRAEA JACQ. (auctore H. J. L.)

Select. Am., 180, t. 114 (1763); Verb. 25.

Distribution: tropical America.

1. **Petraea volubilis** L. Sp. pl. 626 (1753); Verb. 26—Leaves opposite, sometimes ternately whorled, both surfaces scabrid; calyx light-lilac; corolla dark-violet with a white spot on one of the 5 lobes; pedicels 0.3-1.8 cM.

In Herb. Bog. also from:

Java: BACKER, Batavia, culta; FORBES n. 403, Bantam.

Distribution: tropical America, imported into Java! and Luzon (MERRILL).

2. **Petraea arborea** H. B. K., Nov. Gen. et Spec. II, 232 (1817); see also, Verb. p. 371- mentioned from Columbia.

Probably Forbes's cumminucation mentioned on p. 371 of our dissertation is erroneous, both in determination and as concerns the author of the species. What he saw, probably was *P. volubilis L.* A small tree, cultivated in the botanical gardens of Buitenzorg, under the name of *P. arborea* H. B. K. has subamplexicaulous leaves with an undulated margin; the inflorescences reach 12½, the pedicels only 0.8 cM. This species is not mentioned growing cultivated anywhere in these countries, except in the botanical gardens.

7. DURANTA L. (auctore H. J. L.)

Gen. Pl. ed. I, 367 (1737); Verb. 27.

Distribution: tropical America, imported into tropical Asia.

1. **Duranta Plumieri** JACQ.; Select. Am., 186, t. 176, fig. 76 (1763); Verb. 27—A shrub. 4-5 M. high; leaves somewhat pubescent or entirely glabrous; corolla blue-violet, the lobes of the upper lip with dark, that of the lower lip with light lines; drupe orange-yellow.

There are many varieties, among which some have white flowers.

In Herb. Bog. from: Java (EDELING, Bidara tjina (Meester Cornelis) Batavia, 1863), Siam (ZIMMERMANN n. 159 and 133), Hawaiian Islands (Oahu, CURRAN n. 113).

Native names: Patjar tjina (EDELING).

Distribution: tropical America; imported into and cultivated in tropical Asia, and sometimes escaped.

8. CALLICARPA L. (auctore BAKH.)

Gen. Plant. (1737) n. 135; LINN. Gen. Plant. Ed. VI (1764) p. 55; Verb. 45—92.—*Tomex* LINN. Diss. Dass. (1747) p. 5, and in Amoen. Acad. I (1749) p. 389.—*Spondylococca* MITCH. in Act. Phys. Med. Acad. Nat. Cur. VIII (1748) p. 218.—*Johnsonia* T. DALE ex MILL. Gard. Dict. Ed. VI (1752) App. 75.—*Burcardia* (HEIST.) DUHAM. Trait. d. Arbres et Arbust. I (1755) p. 111 pl. 44.—*Illa* ADANS. Fam, II (1763) p. 446.—*Porphyra* LOUR. Flor. Coch. I (1790) p. 69.—*Geunsia* BL. Cat. Gew. Buitenz. (1823) p. 48; Bl. Bijdr. Flor. Ned. Ind. 14e st. (1826) p. 819; Verb. 28—45.—*Johnsonia* CATESBY Nat. Hist. Carol., Flor. Bah. II (1733) p. 47 t. 47.—*Aganon* RAFIN. and *Amictonis* RAFIN. Sylva Tellur. (1838) p. 161.

Trees or shrubs, with a more or less dense stellate or simple tomentum, sometimes glabrous, everywhere more or less glandular-dotted; leaves usually opposite, often with alternate leaves between two opposite pairs, or in pseudo-whorls, rarely all alternate, simple, margins crenate-serrate, or wholly or almost entire, petioled or subsessile; cymes axillary, di-or trichotomous, long- or short-penducled, rarely subsessile; bracts small, linear; pedicels very short; flowers small; calyx campanulate, rarely tubular, minutely 4-5, rarely 6-8-toothed, unaltered or somewhat enlarged in fruit; corolla with short, almost cylindrical tube, 4-5-, rarely to 6-7-lobed, almost regular; stamens 4-5, rarely 6-7, equal, inserted in the lower part of the tube, more or less exserted; anthers fixed above the middle, glandular-dotted, especially at the backside, cells with parallel fissures, often opened and widened in the upper part only; style elongated with capitate or subpeltate, more or less 2-5-obscurely lobed stigma; ovary 2-5-, rarely 6-8-celled, cells 2-1-ovuled, more or less perfectly locellated; fruit drupaceous, globose, with 4-16 one-seeded pyrenes; seeds without albumen.

Distribution: Tropical Asia, China, Japan, Malay Archipelago, Philippines, Polynesia, Australia, America, East-Africa.

1. a. Anther-cells opened and widened in the upper part only. Fruit, when ripe red or pink—Style usually more than 0.9 c.M. long; ovary glabrous; leaves often opposite with 1—2 alternate ones between the pairs, sometimes wholly alternate or in pseudo-3-4-leaved whorls, also only opposite. Big or small trees. . **1. C. pentandra.**

b. Anther-cells opened in the whole length or nearly so; fruit, when ripe, black, violet or white—Style less than 0.9 c.M. long; ovary hairy or glabrous; leaves almost always opposite. Trees or shrubs 2

2. a. Leaves at the lower side tomentose with hairs, which hardly can be rubbed out. 3

b. Leaves at the lower side with a tomentum, which easily can be rubbed out, or subglabrous 8

3. a. Leaves at the upper side densely rugose with permanent simple hairs, at the lower side ferruginously hairy; flowers 4—5—merous; corolla glabrous with large glands; fruit 8—10 or by abortion 4—5—seeded . **2. C. Havilandii**

b. Leaves at the upper side glabrous, or sprinkled with lax stellate hairs on the nerves, at the lower side whitely or cinnamomously hairy; flowers 4—merous; corolla more or less hairy and with minute glands 4

4. a. Corolla densely and appressedly villous without 5

b. Corolla more or less laxely and woolly hairy at the lobes or glabrous . . 7

5. a. Leaves broad-ovate or obovate, $1^{1}/_{2}$—2 times as long as broad, base obtuse, rounded or subcordate; petiole more than 3 c.M. long: corolla 0.25-0.30 c.M. long; fruit with 4-8 seeds. . . . . **3. C. inaequalis**

b. Leaves lanceolate or elliptic-obovate, more than 3 times as long as broad, base acute or acuminate, rarely cuneate; petiole less than 3 c.M. long; corolla 0.20--0.25 c.M. long; fruit with 4 seeds. 6

6. a. Flowers rather large; fruit, when ripe, glabrous, large, depressed at the top, 0.25--0.35 c.M. in diam.; petioles connected with a prominent interpetiolar margin. . . . . **4. C. angustifolia**

b. Flowers small; fruit, when ripe, with sprinkled stellate-hairs, not depressed at the top, less than 0.2 c.M. in diam.; petioles with only little developed interpetiolar margin. . . . . **5. C. angusta**

7. a. Young parts, lower side of the leaves and inflorescences with dense hairs of two sorts, viz. partly very densely with a white appressed tomentum, partly long brownish-plumose; leaves obovate, base obtuse or cuneate; pairs of nerves 7--15; peduncles 1--2 c. M.; calyx densely and woolly villous outside . . . . **6. C. erioclona**

b. Young parts, lower sides of the leaves and inflorescences uniformously hairy with a dense white stellate tomentum only; leaves ovate or oblong, abruptly decurrent and shortly attenuate; pairs of nerves 5--7; peduncles 0.5--0.7 c.M.; calyx densely mealy or farinose outside . . . . . . **7. C. bicolor**

8. a. Lower side of the leaves, when adult, softly tomentose, villous or densely farinose 9

b. Lower side of the leaves, when adult, floccose or subglabrous 15

9. a. Upper side of the leaves, when adult, glabrous or with loose sprinkled stellate hairs at the nerves 10

b. Upper side of the leaves, when adult, more or less permanent fixed-hairy, tomentum sometimes stubbily broken, or simple-hairy 13

10. a. Inflorescences rather small, with very short peduncles 11

b. Inflorescences large and long-peduncled 12

11. a. Calyx minutely toothed; ripe fruits black . . . . **8. C. cana**

b. Calyx distinctly, lanceolately toothed; ripe fruits white . . **11. C. Roxburghii**

12. a. Ovary with stiff hairs, or if subglabrous, covered with dense resin-glands; leaves nearly entire or obscurely toothed, except sometimes at young shoots. Trees with erected inflorescences and black fruits . . . **9. C. tomentosa**

b. Ovary glabrous, glandular; leaves densely and distinctly crenate-serrate. Shrubs with somewhat pendulous inflorescences and white fruits . **10. C. acuminata**

13. a. Calyx long-lanceolately toothed; corolla appressedly hairy outside **14. C. mollis**

b. Calyx shortly toothed, corolla glabrous or with some hairs at the lobes outside 14

14. a. Leaves at the upper side densely and softly simple-hairy, villous. Ripe fruit violet. Small shrubs, 0.7-2 M. high . . . . **13. C. cuspidata**

b. Leaves at the upper side densely and stellately hairy, hairs afterwards stubbily broken. Ripe fruit white. Robust shrubs, 3-5 M. high. . **12. C. macrophylla**

15. a. Corolla more or less pubescent outside; ripe fruit white.—Inflorescences 1.5-7 c.M.; shrubs, sometimes arboreous, 2-10 M. high. . . . . **17. C. longifolia**

b. Corolla glabrous outside; ripe fruit purple 16

16. a. Adult leaves on both sides, at least at the lower one, more or less tomentose, tomentum stellate-hairy, base obtuse or rounded, sometimes subcordate; style 0.6-0.7 c.M. long.— Inflorescences 1.5-3.5 by 2-3.5 c.M.; shrubs 2-4 M. high. . . . . **15. C. pedunculata**

b. Adult leaves on both sides glabrous or subfarinose on the secondary nerves of the lower side only, base acute or acuminate; style 0.3-0.5 c.M. long— Inflorescences usually 1-2 by 1-2.5 c.M.; sometimes up to 5 c.M.. Shrubs 0.5-2 M. high. . . . . **16. C. japonica**

1. **Callicarpa pentandra** ROXB. Hort. Beng. (1814) p. 83 nom. nud.; Roxb. Flor. Ind. I. (1820) p. 409.—*C. Cumingiana* SCHAU. in DC. Prod. Syst. Nat. XI (1847) p. 664.—*C. acuminatissima* TEYSM. et BINNEND. Plant. Nov. in Nat Tydschr. Ned. Ind. XXV (1863) p. 409—*C hexandra* TEYSM. et BINNEND. Plant. Nov. in Nat. Tydschr. Ned. Ind. XXV (1863) p. 410.—*C. paloensis* ELM. in Leafl. Phil. Bot. I. (Jan. 1908) p. 336.—*C. surigaensis* MERR. in Phil. Journ. Sc. III (Aug. 1908) p. 262.—*C. ramiflora* MERR. Phil. Journ. Sc. III (Aug. 1908) p. 262.—*C. basilanensis* MERR Phil. Plants VI in Phil. Journ. Sc. III (Aug. 1908) p. 263.—*C. subglandulosa* ELM. Leafl. Phil. Bot. II (Nov. 1908) p. 513.—*C. apoensis* ELM. Leafl. Phil. Bot. III (1910) p. 861.—*C. flavida* ELM. Leafl. Phil. Bot. III (1910) p. 863.—*C. affinis* ELM. Leafl. Phil. Bot. III (1910) p. 864.—*C. cauliflora* MERR. Phil. Journ. Sc. VII (1912) p. 338.—*C. epiphytica* ELM. Leafl. Phil. Bot. VIII (1915) p. 2871.—*C. megalantha* MERR. Phil. Journ. Sc. X (1915) p. 71.—*C. Weberi* MERR. Phil. Journ. Sc. XII (1917) p. 298.—*Geunsia farinosa* BL. Cat. Gew. Buitenz. (1823) p. 48; Bl. Bijdr. Flor. Ned. Ind. 14e st. (1826) p. 819.—*G. Cumingiana* (SCHAU.) ROLFE Journ. Linn. Soc. XXI (1884) p. 315.—*G. hexandra* (TEYSM. ET BINNEND.) KOORD. Versl. Bot. Dienstr. Minahassa in Med. s' Lands Plant. XIX (1898) p. 559.—*G. Hookeri* MERR. Phil. Journ. Sc. VII (1912) p. 342.—*G. pentandra* (ROXB.) MERR. Phil. Journ. Sc. Bot, XI (1916) p. 309.—*G. grandiflora* HALL. f. Med. 's Rijks Herb. Leid. No. 37 (1918) p. 24.—*G. quaternifolia* HALL. f, l. c. p. 24.—*G. subternata* HALL. f. l. c. p. 25.—*G. homoeophylla* HALL. f. l. c. p. 26.—*G. serrulata* HALL. f. l. c. p. 27.—*G. anisophylla* HALL. f. l. c. p. 29.—*G. cinnamomea* HALL. F. l. c. p. 30-*G. acuminatissima* (TEYSM. ET BINNEND.) H. J. L. Verb. Mal. Arch. (1919) p. 32.—*G. Pullei* H. J. L. l. c. p. 35.—*G. epiphytica* (ELM.) H. J. L.-l. c. p. 38.—*G. flavida* (ELM.) H. J. L.-l. c. p. 39.—Trees, 3-26 M. high; branches with stellate- or simple-hairy tomentum, leaves opposite, but also often opposite with 1-2 alternate ones between the pairs in the same tree, ovate-oblong or subobovate, base rounded or subacute, shortly acuminate to the petiole, more or less attenuate at the apex, almost entire, rarely unequally dentate, upper side, when adult, usually glabrous or sometines densely pubescent, lower side mealy sometimes glabrous, sparsely covered with resin-glands, pairs of nerves 7-15, 5-35 by 2-15 c. M.; petioles 1-2 c. M. long; with a more or less distinct interpetiolar callus; cymes axillary, rather large, sometimes reduced to subsessile inflorescences, dichotomous, densely and many-flowered; peduncles 2-10 c.M. long, rarely shorter; bracts very small and sessile, lanceolate, acuminate, mealy, 0.2-0.7 by 0.05-0.10 c.M.; flowers rather large, shortly pedicellate or subsessile; calyx shortly 4-8 toothed, densely hairy or subglabrous outside, glabrous inside, 0.1-0.4 by 0.15-0.25 cM., somewhat enlarging in fruit; corolla large, 5-4-rarely 6-8-lobed glabrous, rarely with some floccose hairs at the lobes outside, tube cylindrical, 2-3-times as long as the calyx, lobes subequal and radially spread, oblong or ovate, 0.15-0.25 bij 0.10-0.15 c.M.; stamens 5-4, rarely 6-7, long exserted, 2-4-times as long as the corolla-lobes, 0.6-1 c.M. long, filaments filiform, glabrous, anthers large, 0.2-0.3 bij 0.07-0.10 c.M., opened and widened in the upper part near the top of the fissures only, with dense resin- glands; style elongated, with subpeltate obscurely lobed stigma long exserted, glabrous rarely less than 1-1.2 c.M. long: ovary glabrous with dense resin- glands, 5-4-celled; drupe rather large, globose, depressed at the top, red when ripe, 0.3-0.6 c.M. in diam., with 4-16-one seeded pyrenes.

Distribution; Siam; Malacca; Malay Archipelago; Philippines.

Of the many varities and forms in Herb. Bog., the following ones are to be noticed:

1. a. Upper side of the leaves, when adult, glabrous, except on the nerves. . . 2
b. Upper side of the leaves, when adult, pubescent.

Var. γ **Cumingiana.**

2. a. Lower side of leaf, when adult, glabrous, or with a more or less farinose tomentum, especially on the nerves; tomentum of stellate hairs, which easily can be rubbed off; resin-glands distinct. Var. α **typica.**
b. Lower side of leaf, when adult, with a dimorphous tomentum, partly on the nerves, exsisting of stellate hairs, which easily can be rubbed off, partly, on the lamina between the nerves, with dense lanate or appressed hairs, which can not be rubbed off entirely; resin-glands inconspicuous, being covered by the tomentum.

Var. β **paloensis.**

Var. α **typica** (SCHAU.) BAKH., var. nov. — Arbuscula vel arbor, 5-25 M. alta; folia adulta, supra praeter nervos glabra, subtus glabrata, vel in nervis farinosa subtomentosa, tomento uniforme e pilis stellatis, facile radibilibus, punctis glandulosis sub lente distinctis.

Forma 1: **typica**, BAKH. f. nova. — *Callicarpa pentandra* ROXB. (1814); — *C. acuminatissima* TEYSM. et BINNEND. (1863); — *C. subglandulosa* ELM. (1908); — *Geunsia pentandra* (ROXB.) MERR. (1916) — *G. acuminatissima* (T. et B.) H. J. L. (1919).-

Ramuli obtuse quadrangulares vel subteretes, tenues; foliorum oppositorum paria singula cum foliis 1-2 simplis alternantia, rarius folia omnia opposita, ovata vel oblonga, raro elliptica, basi cuneata vel lato-subrotundata, apice abrupte acuminata longissime subcaudato-attenuata, integerrima,

rarissimo obsolete mucronato-denticulata vel crenata, adulta utrinque glabrescentia, siccando viridia vel rava, 10-30 c.M. longa, 4-11 c.M. lata; nervis lateralibus utrinque 7-12; petiolus 2-5 c.M. longus; cymi magni 5-10 c.M., raro usque ad 15 c.M. longi pedunculus 3-7 c.M. longus, calyx 5- raro 4- denticulatus, extus sparse stellato-pubescens, aetate subglabrescens, 0.10-0.15 c.M. altus, fructifer vix auctus; corolla 5- raro 4- laciniata, extus glabra, raro pilis stellatis sparsis, 0.5-0-6 c.M. alta; stamina 5, raro 4, longe exserta, 0.7-1 c.M. longa; antherae oblongae 0.15-0.25 c.M. longae; drupa globosa, maturitate sanguinea, subopaca, 5-raro 4-locularis, laculis simplicibus, monospermis; semina 5-4.

Distribution: Java; Celebes; Moluccas; N-Guinea; Philippines.-

Forma 2. **farinosa** (BL.) BAKH. f. nova.—*Geunsia farinosa* BL. (1826);—*G. Pullei* H. J. L. 1919.—Ramuli obtuse quadrangulares, crassiusculi; foliorum oppositorum paria singula cnm foliis 1-2 simplis alternantia, et intermixta tantum opposita, oblonga vel elliptica, basi cuneata vel rotundata, apice sensim acuminata, integerrima, rarissime distanter denticulata, adulta supra praeter nervos glabrescentia subtus farinosa, siccando incana vel rava, 7-15 c.M. longa, 4-12 c.M. lata, nervis lateralibus utrinque 10-15; petiolus 2-7 c.M. longus; CYMI magni 7-15 c.M. longi; pedunculus 3-10 c.M. longus; calyx 5- raro 4- denticulatus, extus densissime farinoso-stellato-tomentosus 0.15-0.25 c.M. altus, fructifer vix auctus; corolla 5- raro 4- vel 6- laciniata, extus subglabra, aut sparse praecipue dorso laciniarum, stellato-pubescens, 0.5-0.8 c.M. alta; stamina 5-4, raro 6, longe exserta, 0.71-1 c.M. longa; antherae oblongae, 0.15-0.30 c.M. longae; drupa globosa maturitate sanguinea, sublucescens, 5- locularis, loculis 2-1- spermis.

Distribution: Siam; Malacca; Sumatra; Java; Moluccas; N.-Guinea.

Forma 3, **hexandra** (TEYSM. et BINNEND.) BAKH. nov. f.—*Callicarpa hexandra* TEYSM. et BINNEND. (1863).—*Geunsia hexandra* (T. et B.) KOORD. (1898)—*Callicarpa ramiflora* MERR. (1908).—*Callicarpa affinis* ELM. (1910),—? *C. cauliflora* MERR, (1912).—*Geunsia Hookeri* MERR. (1912).—*Callicarpa megalantha* MERR. (1915).—*Geunsia grandiflora* HALL. f. (1918). Ramuli quadrangulares, crassi; foliorum oppositorum paria singula cum foliis 1-2 simplis altérnantia, rarius folia omnia opposita, ternata vel subquaternata, late ovata vel lato-oblonga, basi vulgo obtusa vel rotundata, raro subacuminata, vel subcordata, apice sensim vel abrupte acute acuminata, raro obtusa, integerrima, raro repando-dentata vel mucronata, adulta supra praeter nervos glabrescentia, subtus molliter dense tomentosa, siccando ferruginea vel fulva, 10-35 c.M. longa, 5-17 c.M. lata; nervis lateralibus utrinque 7-12; petiolus 1-5 c.M. longus; cymi vulgo magni, raro [minusculi 1 $^1/_2$-15 c.M. longi; pedunculus 2-10 c.M. longus, raro subnullus; calyx 5- raro 4-mucronatus vel breviter dentatus, extus densissíme farinoso-stellato-subtomentosus, 0.15-0.30 c.M. altus, fructifer paulo auctus scutelliformis, drupae inferidiem partem amplectens corolla 5- vel 6-7- raro 4-laciniata, extus, praecipue in dorso segmentorum stellato-tomentosa vel farinosa, 0.3-0.7 c.M. alta; stamina 5-4, raro 6-7, longe exserta, 0.7-1 c.M. longa; anthera oblonga vel lanceolata, 0.15-0.35 c.M. longa; drupa depresse globosa, vulgo subumbilicata, quam ea precedentis major, matura coccinea, lucescens, 5- vel 4- locularis, loculis 2-1- spermis; semina 10-8, raro 5-4.

Distribution; Moluccas; Celebes; Philippines,

Var. β. **paloensis** (ELM.) BAKH.—nov. var.—Arbuscula vel arbor, 5-15 M. alta; folia adulta supra praeter nervos glabra, subtus tomento biforme, supra nervos pilis stellatis radibilibus tecta, inter eos pilis lanatis densissime repletis subpersistentibus, punctis glandulosis sub tomento absconditis.

Forma 1 **typica** Bakh., nova. f.—*Callicarpa paloensis* ELM. (1908).—Ramuli obtuse quadrangulares, tenuisculi; foliorum oppositorum paria singula cum foliis 1-2 alternantia, vel folia omnia opposita, lanceolato-oblonga basi cuneata vel attenuata, apice sensim attenuato-acuta, integerrima, margine subundulata, adulta supra glabrescentia, subtus subadpresse farinosa, siccando mellea, 10-20 c.M. longa, 4-6 c.M. lata, nervis lateralibus utrinque 9-11; petiolus 1.5-3 c.M. longus; cymi mediocres, 7-9 c.M. longi. pedunculus 3-5 c.M. longus; calyx 4- mucronatus vel subtruncatus, extus densissime farinosus, 0.10-0.15 c.M. altus, fructifer vix auctus scutelliformis, drupae basem amplectens, corolla 4- laciniata, extus glabrata, 0.25 c.M. alta; stamina breviter exserta; antherae oblongae 0.1 c.M. longae; drupa globosa, parva, matura coccinea, lucescens, 4- locularis, loculis simplicibus, monospermis.

Coll. Herb. Bog.: Leyte, Palo (ELMER No. 7370).

Distribution: Philippines.

Forma 2. **apoensis** (ELM.) BAKH. nov. f.—*Callicarpa apoensis* ELM. (1910).

Ramuli acute subalato-quadrangulares, crassi; folia opposita, foliorum oppositorum paria singula cum foliis 1-2 alternantia, vel folia alterna, oblonga vel lanceolato-elliptica, basi cuneata vel abtusa aut subrotundata, apice sensim angustata, acuta vel subobtusa integerrima, 10-25 c.M. longa, 4-8 c.M. lata; nervis lateralibus utrinque 9-15; petiolus 2.5-5 c.M. longus; cymi majusculi vel mediocres, 5-15 c.M. longi; pedunculus 4.7-5 c.M. longus; calyx breviter 4-5-dentatus vel subtruncatus, extus dense farinosus, 0.10-0.15 c.M. altus, fructifer vix auctus scutelliformis, drupae basem amplectens; corolla 4-5- laciniata, extus tomentosa vel subglabrata, (0.3 c.M.) alta; stamina 4 (-5); longe exserta; antherae ovato-ellipticae vel oblongae, 0.1 M. longae; drupa subglobosa, parva, matura coccinea, 4-5- locularis, loculis simplicibus monospermis.

Coll. Herb. Bog.: Mindanao, Todaya, Mt. Apo (ELM No. 11491).

Distribution: Philippines; Celebes.

Forma 3. **celebica** (KOORD.) BAKH. nov. f.—*Geunsia celebica* KOORD msc.—Ramuli obtuse quadrangulares, crassi; foliorum oppositorum paria singula cum foliis 1-2 alternantia, rarius folia omnia opposita, ovata vel late oblonga, basi obtusa vel late rotundata, apice abrupte et breviter acuto-acuminata, integerrima, rarissimo serrato-dentata, adulta praeter nervos glabrescentia, subtus subrugosa, adpresso-albido-tomentosa, in nervis glaberrima, inter eos adpresse lanata, siccando argenteo-albida. 15-25 c.M. longa, 5-10 c.M. lata; nervis lateralibus utrinque 7-12; petiolus 2-3 c.M. longus; cymi, mediocres, 6-9 c.M. longi; penduneulus 2.5-6 c.M. longus; calyx breviter 5-6-dentatus, extus sparse pilosus vel subglaber, 0.1-0-2 c.M. altus, fructifer ad duplam magnitudinem auctus, cupuliformis, drupae dimidio inferiore calyce amplectens; corolla 5-7-raro 4-laciniata, extus glabra, 0.4-0.5 c.M. alta; stamina 5, longe exserta, 0.6-0.8 c.M. longa; antherae oblongae vel lanceolatae, 0.15-0.20 c.M. longae; drupa subdepresse globosa, majuscula, matura rubra, 5- locularis, loculis bipartitis, locellis monospermis; semina 10.

Coll. Herb. Bog.: Celebes, Menado, near Gorontalo (Riedel); Ratahan (Koord 19488; 19714); Loeboe (Koord. 19499; 19509).

Distribition: Celebes.

Forma 4. **furfuracea** BAKH. nov. f.—Ramuli obscure quadrangulares vel subteretes, tenuisculi; foliorum oppositorum paria singula cum foliis 1-2 alternantia vel folia subternata vel subquaternata, raro omnia opposita, vulgo minuscula, oblonga vel lanceolata, basi cuneata, obtusa vel rotundata, saepe subcordata, apice abrupte breviter acute acuminata, integerrima, adulta supra praeter nervos glabrescentia, subtus subrugosa, furfuracea vel farinosa, saepe subadpresse densissime tomentosa, in nervis pilis stellatis ferrugineis tectis, inter quos albido-lanata, siccando cinnamomea vel rava, saepe albida, 7-25 c.M. longa, 3-10 c.M. lata, nervis lateralibus utrinque 7-12; petiolus 0.15-0.30 c.M. longus; cymi mediocres vel minusculi, 3-10 c.M. longi; pedunculus 1.5-6 c.M. longus; calyx breviter 5-dentatus, extus densissime furfuraceus, 0.10-0.20 c.M. altus, fructifer ad duplam triplamve magnitudinem augens, cupuliformis, drupam saepe usque ad apicem includens; corolla 5-laciniata, extus dense minutissime farinoso-tomentosa, 0.3-0.6 c.M. alta; stamina 5, longe exserta, 0.6-1 c.M. longa; antherae lanceolatae vel sublineares, 0.20-0.35 c.M. longae; drupa subdepresse globosa, mediocris, matura rubra, 5- locularis, loculis bipartitis, locellis monospermis; semina 10, raro 5.

Coll. Herb. Bog.: Celebes: Tjamba (TEYSM. 12529); Kp. Tapalang Mamoedjoe (NOERKAS exp. V. VUUREN 425); G. Padang Kadjang (RACHMAT exp. V. VUUREN 839).—Borneo: Lampai (TEYSM. 8503); Boekit Liang Karing (JAHERI, exp NIEUWENH. 1232); Tandjong, Plechari (LABOHM 1152); Soengei Semisir (Boschw. 1900); Banka: Soengei Slan (TEYSM. Dec. 1869; Berkh. 1005); Pangkal Pinang (TEYSM.- Klienka- Maart);- Sumatra: Palembang, Moesi Oeloe (ENDERT 36).

Distribution: Celebes, Borneo, Banka, Sumatra.

Forma 5. **flavida** (ELM.) BAKH.—*Callicarpa flavida* ELM. (1910).—*C. epiphytica* ELM. (1915)—*Geunsia epiphytica* (ELM.) H. J. L. (1919).—*Geunsia flavida* (ELM.) H. J. L. (1919).—Ramuli obscure quadrangulares vel subteretes, subtenues; foliorum oppositorum paria singula cum foliis 1-2 alternantia, folia saepe subternata-quaternataque vulgo minuscula, oblonga vel lanceolata, basi cuneata vel acuta, raro subtruncata, apice sensim attenuato-acuta, saepe subcaudata, integerrima, adulta supra praeter nervos glabra, subtus subrugosa, densissime furfuracea siccando flavida vel mellea, tomento albido-lanato suffulta, 7-17.5 c.M. longa, 2.5-6 c.M. lata; nervis lateralibus utrinque 5-10; petiolus 1.5-2.5 c.M. longus; cymi mediocres vel minusculi, 5-7 c.M. longi; pedunculus 3-5 c.M. longus; calyx breviter 6-8- dentatus, extus densissime furfuraceus, 0.25-0.30 c.M. altus, fructifer ad duplam triplamve magnitudinem augens cupuliformis, drupam fere totam includens; corolla 6-8- laciniata, extus praecipue dorso laciniarum densissime furfuraceo-tomentosa, 0.4-0.6 c.M. alta; stamina 6-7, longe exserta, 0.6-0.9 cM.; antherae oblongae vel lanceolatae, 0.25-0.35, c.M. longa; drupa globosa, majuscula, matura rubra, 0.4-0.5 c.M. diam., 6-7- locularis, loculis bipartitis, locellis monospermis; semina 6-12 (-14).

Coll. Herb. Bog.: Mindanao, Tadayo (ELM. 11851 - *C. flavida* ELM.); Cabadbaran, Mt. Urdaneta (ELM. 13822; 13861 - *C. epiphytica* ELM.).

Distribution: Philippines.

Var. γ **Cumingiana** (SCHAU.) BAKH., nov. var.—Arbor vel arbuscula, saepe frutex, altitudine 4-20 M.; folia adulta supra omnino pubescentia.

Forma **1. typica** BAKH., nov. f.—*Callicarpa Cumingiana* SCHAU. (1847)—*C. basislanensis* MERR. (1908)—Ramuli obtuse quadrangulares, tenuisculi; foliorum oppositorum paria singula cum foliis 1-2 alternantia, folia rarius subternata-quaternataque, lato-ovata vel oblonga, basi obtusa vel retundata, saepe subcordata, apice abrupte attenuato-acuta, raro obtusa, integerrima vel minutissime denticulata, adulta supra dense et mollissime pilis simplicibus et stellatis intermixtis persistens-hirsuta, subtus mollia, densissime pilis stellatis uniformiter tomentosa, siccando ferruginea, 7-20 c.M. longa, 3.5-12 c.M. lata; nervis lateralibus utrinque 7-12; petiolus 1-3 c.M. longus; cymi parvi, 2-7 c.M. longi, raro subsessiles; pedunculus 0.5-4 c.M., raro subnullus; calyx breviter 4-dentatus, vel subtruncatus, extus farinosus, raro subglaber, 0.10-0.20 c.M. altus, fructifer breviter vel vix auctus cupuliformis drupam inferius dimidium amplectens; corolla 4-laciniata, extus subglabra, vel laciniarum dorso sparse farinosa, 0.4-0.6 c.M. alta; stamina 4, longe exserta, 0.6-1 c.M. longa; antherae oblongae 0.2-0.3 c.M. longae; drupa globosa, mediocris, matura rubra, 4-locularis, loculis simplicibus; monospermis.

Coll. Herb. Bog.: Basilan (ROBINS. 11502- *C. basilanensis* MERR.)

Distribution: Philippines; N-Guinea.

Forma **2. surigaensis** (MERR.) BAKH. nov. f.—*Callicarpa surigaensis* MERR. (1908)—Ramuli subteretes, tenuisculi; foliorum oppositorum paria singula cum foliis 1-2 alternantia, saepe folia omnia, oblonga vel lanceolato-oblonga, basi acuta, raro cuneata apice sensim in acumen caudato-attenuata, minutissime serrato-denticulata, adulta supra dense ferrugineo-hirsuta, subtus subdense, molliter pilis stellatis uniformiter tomentosa, siccando ferruginea, 10-15 c.M. longa, 3.5-1 c.M. lata; nervis lateralibus utrinque 7-10; petiolus 1-2 c.M. longus; cymae minusculae, 3-4 c.M. longae; pedunculus 1.2-5 c.M. longus; calyx breviter 4-5- dentatus, extus dense ferrugineo-hirsutus, ± 0.3 c.M. altus, fructifer paulo auctus, cupuliformis, drupam inferius dimidium amplectens; corolla 4-5- laciniata, extus glabra, ± 0.5 c.M. alta; stamina 4-5, longe exserta, ± 0.4 c.M. longa; antherae lanceolato-oblongae, ± 0.2 c.M. longae; drupa subdepresse globosa, mediocris, matura (rubra) (4-) 5- locularis, loculis bipartitis, locellis monospermis; semina (4-)5- (8-)10-.

Coll. Herb. Bog.: Mindanao, Surigao (AHERN 318 Q).

Distribution: Philippines.

Forma 3. **pentamera** (H. J. L.) BAKH.— nov. f.— *Geunsia Cumingiana* (SCHAU.) ROLFE (1884).—*G. Cumingiana* (SCHAU.) ROLFE *var. pentamera* H.J.L. (1919).—*Ramuli* obtuse quadrangulares vel subteretes, crassi vel crassiusculi; foliorum oppositorum paria singula cum foliis 1-2 alternantia, folia raro subternata quaternatave, lato-oblonga, vel lanceolato-oblonga, raro obovata, basi cuneata, obtusa vel rotundata, raro subcordata, apice abrupte vel subsensim acute subcaudato-attenuata, integerrima, raro obsolete mucronata, adulta supra dense et mollissime pilis simplicibus et stellatis intermixtis persistens-hirsuta, subtus mollissime et dense pilis stellatis uniformiter tomentosa, siccando subferruginea, 10-30 c.M. longa, 7-14 c.M. lata, nervis lateralibus utrinque 10-15; petiolus 1.5-3.5 c.M. longus; *cymi* majusculi, 7-15 c.M. longi; pedunculus 4-10 c.M. longus; calyx 5-6- raro 4- dentatus, extus dense farinosus, 0.15-0.30 c.M. altus, fructifer vix auctus (?); corolla 5-6.— raro 4-laciniata, extus subglabra, vel laciniarum dorso sparse pilosa, 0.4-0.7 c.M. alta; stamina 5-6, longe exserta, 0.6-1 c.M. longa; antherae lanceolatae vel oblongae, 0.2-0.3 c.M. longa; drupa globosa, mediocris, matura rubra, 5- locularis, loculis bipartitis, locellis monospermis; semina 5-10.

Distribution: Moluccas! Celebes! Philippines!

Forma 4. **dentata** BAKH.—nov. f.—*Ramuli* obtuse quadrangulares, crassiusculi; foliorum oppositorum paria singula cum foliis 1-2 alternantia, lato-ovata vel oblonga, aut lanceolata vel obovata, basi obtusa vel rotundata, raro subcordata vel subacuta, apice abrupte caudato-attenuata, acuta, grosse vel minutissime repando-dentata, adultà supra dense subrugosa, ferrugineo-hirsuta, subtus rugosa, sparse pilis stellatis subtomentosa, siccando rava vel subferruginea, 10-20 c.M. longa, 3-12 c.M. lata, nervis lateralibus utrinque 10-15; petiolus 1-5-3.5 c.M. longus; *cymi* mediocres, 5-7 c.M. longi; pedunculus 3-5 c.M. longus; *calyx* 5- dentatus, extus dense farinosus, 0.15-0.20 c.M. altus; corolla 5- laciniata, extus subglabra, vel a dorso laciniis sparse pilosa; semina 5.

Coll. Herb. Bog.: Java: Noesa Kembangan (BACKER 4611.).— Sumatra: Lampong, Tarabangi (TEYSM. 42844).

Distribution: Java! Sumatra!

2. **Callicarpa Havilandii** (KING/GAMBLE) H. J. L. Verb. Mal. Arch. (1919) p. 52.—*Geunsia Havilandii* KING/GAMBLE Kew. Bull. (1908) p. 105; KING/GAMBLE, Mat. Flor Mal. Pen. (1909) p. (801) 1011.—Branchlets, cymes and petioles densely, rugosely ferruginously stellate-pubescent; leaves opposite, short-petioled, subchartaceous, elliptic or oblong, often subobovate, base cuneate or acuminate, apex subabrupt shortly acuminate, margins denticulate, except at the base, upper side densely, rugosely and ferruginously long simply pubescent with permanent hairs, lower side

rather softly or rugosely and densely long-ferruginously stellately and simply perminently hairy on the nerves only, with large resin-glands; pairs of nerves 7-15; 6-20 c.M. long, 3-7 c.M. wide; petioles long rugose-hairy, 1-2.5 c.M. long; cymes small, few-flowered, 1.5-3 c.M. long. 3-4 c.M. in diam; peduncles 0.3-1 c.M., rugosely stellate-pubescent; calyx shortly 4-5-toothed or subentire, densely, rugosely, ferruginously stellate-hairy and with large resin-glands outside, 0.1-0.2 by 0.1-0.15 c.M.; somewhat enlarged in fruit; corolla 4-5-lobed, glabrous and with large resin-glands outside, 0.35-0.5 c.M.; tube $1^1/_2$-2 times as long as the calyx, 0.2-0.25 c.M. long, lobes ovate or oblong, rounded at the top; stamens 4-5, exserted, 0.6 c.M; filaments glabrous; anthers oblong, with dense small resin-glands, 0.15-0.20 c.M. long; style filiform, 0.5-0.8 c.M. long, with obscurely lobed subpeltate stigma; ovary glabrous, densely covered with large bright-yellowish resin-glands, 4-5-lobed; cells 1-2-ovuled; drupe rather large, globose, somewhat depressed at the top, glabrous when mature, with sparse resin-glands, 0.3-0.5 c.M. in diam., with 4-8 (-12) one-seeded pyrenes.

Distribution: Borneo!

Geunsia Beccariana Briq. in Engl. Prantl. Nat. Pflanz. Fam. VI 3a (1897) p. 165, is a doubtful species, and perhaps only a nomen nudum. Its relation with the *C. Havilandii* (KING/GAMBLE) H. J. L. is not yet certain.

3. **Callicarpa inaequalis** TEYSM. et BINNEND. MSC.—nov. spec. — *C. erioclona* SCHAU. var. latifolia H. J. L. Verb. Mal. Arch. (1919) p. 77.—

Frutex; ramuli obtuse quadrangulares, rugosa, densissime pilis stellatis subferrugineo-farinosi, resinis punctatis sub tomento absconditis, sparse lenticellati; folia opposita, longe petiolata, coriacea, submagna, lato-ovato-oblonga vel subobovata, basi obtusa vel rotundata, raro subcordata, apice subabrupte obtuse brevi acuminata vel obtusa, inaequaliter repando-grosso-serrato-dentata, adulta supra glabra, subtus dense appresse perpetuo incano-subfarinoso-tomentosa, utrinque resinis punctatis et glandulis peltatis adspersis, reticulato-venosa; 10-28 c.M. longa, 5-12 c.M. lata; petioli basi distincte calloso-connati, superne sulcati, dense appresse farinosi, 3-5 c.M. longi, nervis lateralibus utrinque 7-10; cymi parvi, solitarii, laxi subpauciflori, breviter pedunculati, 2-3 c.M. longi, 3-5 c.M. diam., densissime appresse farinosi; pedunculus 1-1.5 c.M. longus; calyx brevissisime 4-dentatus vel subtruncatus, 0.15-0.20 c.M. altus, 01-0.15 c.M. diam., extus densissime incano- vel ferrugineo-farinosus, margine glabrescens, utrinque resinis punctatis, fructifer vix auctus; corolla 4-laciniata, 0.4-0.5 c.M., extus densissime appresse tomentosa, intus glabra, utrinque resinis punctata, tubo cupuliforme, calyce $1^1/_2$-2-plo longiore, 0.25-0.30 c.M. longo, laciniis subuniformibus, oblongis apice obtusis vel rotundatis, 0.15-0.20 c.M. longis, 0.10-0.12 c.M. latis; stamina 4, breviter vel vix exserta, 0.4-05 c.M. longa, filamento filiforme terete glabro, anthera oblonga infra medium dorsifixa, loculis longitudinaliter fissis, resinis punctatis, 0.20-0.25 c.M. longis; stylus teres, filiformis, brevi exsertus, 0.6-0.8 c.M. longus, stigmate peltato, obscure lobato; ovarium globosum, dense pilis stellatis et resinis punctatis, 4-loculare, loculis 2-ovulatis; drupa submagna, adpresse

globosa, maturitate atro-purpurea vel nigra, sparse pilis stellatis et resinis punctatis, 0.25-0.35 c.M. diam; semina 4-8, lateraliter compressa.

Java: Buitenzorg (Tjiampea- C. INAEQUALIS T. ET B.); Goeha Gadja (BACKER No. 5936); Bandjar (BACKER -27 Dec. 1910).

Distribution: JAVA!

4. **Callicarpa angustifolia** KING/GAMBLE. in Kew Bull. (1908) p. 106; KING/GAMBLE Mat. Flor. Mal. Pen. (1909) p. 1014.

Distribution: Malay Peninsula! Sumatra! Banka!

5. **Callicarpa angusta** SCHAU. in DC. Prod. Syst. Nat. XI (1847) p. 642.

Distribution: Philippines!

6. **Callicarpa erioclona** SCHAU. in DC. Prod. Syst. Nat. XI (1847) p. 643.— C. *cana* L. *Var. repanda* WARB. Plant. Pap. in Engl. Bot. Jahrb. XIII. 2 (1890) p. 426.— C. *repanda* K. SCHUM. & WARB. Flor. Neu-Pomm. in Not. Bot. Gart. Mus. Berl. II (1898) p. 144.— C. *subalbida* ELM. in Leafl. Phil. Bot. I (1908) p. 337.— C. *rivularis* MERR. in Phil. Journ. Sc. VII (1912) p. 340— C. *fumata* ZIPP. ex H. J. L. Verb. Mal. Arch. (1919) p. 77 sub. C. *erioclona*.

Distribution: Philippines! Celebes! N.-Guinea! New-Britain! New-Ireland!

Var. α **typica** H. J. L., Verb. Mal. Arch. (1919) p. 77.

Forma 1. **typica** BAKH.— nov. f.— C. *erioclona* SCHAU. (1847).— C. *fumata* ZIPP. ex H. J. L, (1919).

Philippines: ELMER No. 11190.

Distribution: Philippines! Celebes! N.-Guinea! N.-Britain!

Forma. 2. **rivularis** (MERR.) BAKH.— nov. f.—C. *rivularis* MERR. (1912).— Folia angusta, lanceolato-obovata, utrinque sensim attenuato-acuta, praeter basin et apicem minutissime repando-dentata, 7-20 c.M. longa, 1.5-4 c.M. lata; petiolus 0.5-1.5 c.M.; calyx appresse lanatus; corolla dorso laciniarum sparse pilis stellatis suffulta.

Palawan: Foxworthy No. 660 and 719.

Distribution: Philippines!

Var. β **repanda** (K. SCH. et WARB.) H. J. L., Verb. Mal. Arch. (1919) p. 78.— C. *cana* L. *var. repanda* WARB. (1890).— C. *repanda* K. SCHUM. & WARB. (1898).

Distribution: New-Britain! New-Ireland!

Var. γ **subalbida** (ELM.) BAKH.— nov. var.—C. *subalbida* ELM. (1908).— Folia oblonga vel elliptica, basi cuneata vel subrotundata, apice sensim longe acuminata, integerrima, 10-20 c.M. longa; 3.5-7 c.M. lata; petiolus 1-2 c.M.; calyx sparse lanata margine subglabrescens; corolla subglabra.

Luzon: ELMER No. 9184.

Distribution: Philippines!

7. **Callicarpa bicolor** JUSS., Ann. Mus. Hist. Nat. VII (1806) p. 77; SCHAU. in DC. Prod Syst. Nat. XI (1847) p. 642.— C. *paucinervia* MERR., Phil. Journ. Sc. Bot. IX (1914) p. 134—A shrub with densely and farinosely tomentose branches, petioles and cymes; *leaves* opposite, subcoriaceous, oblong

or lanceolate, at both ends acute-attenuate, more or less irregularly serrate-dentate, except towards the base, upper side glabrous when adult and with a wrinkled surface, lower side greyish densely dimorphously tomentose, partly, especially on the nerves laxely stellate-hairy, partly permanently shortly white-woolly and villous; pairs of nerves 5-7; 7-15 c.M. long, 3-7 c.M. wide; petioles 1-2 c.M. long; cymes small with short peduncles, 1.5-3 by 2-4 c.M.; laxely dichotomous, many-flowered; peduncles 0.5-0.7 c.M.; calyx shortly 4-toothed, densely mealy stellate-hairy, 0.10-0.12 c.M.; corolla 4-lobed, scarcely hairy or subglabrous outside, $1^1/_2$-2 times as long as the calyx, 0.17-0.25 c.M.; stamens 4, 0.4-0.5 c.M., exserted; style 0.5-0.6 c.M.; ovary glabrous, densely glandular; drupe globose, small, in mature dark purple or black, 0.20-0.25 c.M. in diam.

Distribution: New-Britain! Philippines!

8. **Callicarpa cana** L. Mant. Plant. (1771)p. 198,—C. *tomentosa* (not of L.) LAM. Enc. Méth. I (1783)p. 562.—C. *americana* (not of L.) LOUR. Flor. Cochin. I (1790) p. 70.—C. *adenanthera* R. BR. Prod. Flor. Nov. Holl. (1810) p. 513.—C. *Heynii* ROTH. Nov. Plant. Spec. (1821)p. 82.—C. *Rheedii* KOSTEL. Allg. Med. Pharm. Fl. III (1836)p. 829; Index Kew. I (1893)p. 386.—C. *sinensis* HORT. ex STEUD Nom. Ed. II, I (1841)p. 217.—C. *sumatrana* MIQ. Flor. Ned. Ind. II (1856)p. 886.— C. *dentata* ROXB. fide WALL. Cat. No. 1834 (1828) ex CLARKE in HOOK. f. Flor. Brit. Ind. IV (1885)p. 569 sub. C. CANA partly.—(?) C. *macrocarpa* RAEVSCH Nom. Ed. III (1797)p. 37 ex Index Kew. (1893)p. 386.—(?) C. *laciniata* H. J. L. Verb. Mal. Arch. (1919)p. 68.—(?) C. *latifolia* ZIPP. ex SPANOGHE Prod. Flor. Timor. Linnaea XV (1841)p. 330 (after MIQ. (1856) l. c. and H. J. L. (1919) l. c).— C. *runcinata* ZIPP. ex H. J. L., Verb. Mal. Arch. (1919)p. 73 sub. C. cana.

Distribution: Malabar (WILLD.); Silhet (VOIGT.); Chittagong (WATT.); Calcutta (SCHAU.); Malacca; Cochin-China (LOUR.); China (FORB. HEMSL.); Philippines; Malay Archipelago; New-Guinea; Polynesia; Australia-Bourbon (SCHAU.-? Cult.).-

Var. α **typica** Bakh.— nov. var. — Corolla quite glabrous; leaves variable in form, ovate-rotundate or broadly-oblong, small or rather large, base abruptly, rather long decurrent, apex shortly and abruptly acuminate or rounded, margins irregularly serrate-dentate; except naer the base; 5-25 c.M. long, 4-15 c.M. wide; petioles 1.5-3.5 c.M.

Distribution: Java! Borneo! Timor! Australia!

Var. β **sumatrana** (MIQ.) H. J. L. Verb. 71.— C. *cana* L. Bot. Mag. vol. 47 (1820) pl. 2107.—C. *sumatrana* MIQ. Flor. Ned. Ind. II (1856) p. 886.—Corolla on the lobes densely white tomentose outside; leaves oblong or lanceolate-ovate, attenuate, at both ends, margins small-denticulate; 10-15 c.M. long, 3-10 c.M. wide; petioles 0.5-2 c.M.

Sumatra: Padang (TEYSM. 1159; 3084); Lampong (TEYSM 4381).

Distribution: Sumatra! Malacca! Bengal!

9. **Callicarpa tomentosa** (L.) MURR. Syst. Veg. Ed. XIII (1774) p. 153; GAERTN. Fruct. Sem. Plant. II (1791) p. 81, tab. 94; GMEL. Syst. Nat. II,

I Ed. XIII (1796) p. 246; MURR.-PERS. Syst. Veg. I Ed. XV (1797) p. 159.— C. *lanata* L. Mant. Plant. (1767) p. 33.—C. *villosa* VAHL. Symb. Bot. Plant., III (1794) p. 14.—C. *Tomex* POIR. in LAM. Enc. Suppl. II (1811) p. 32.— C. *aborea* ROXB. Hort. Beng. (1814) p. 10; ROXB. Flor. Ind. I (1820) p. 405.— C. *Wallichiana* WALP. Rep. Bot. Syst. IV (1844-1848) p. 125.—C. *magna* SCHAU. D.C. Prod. Syst. Nat. XI (1847) p. 641.— C. *integerrima* CHAMP. ex BENTH. in Journ. Bot. Kew. Gard. Misc. V (1853) p. 135.—C. *cana* (not of L.) DALZ. & Gibs. Bomb. Flor. (1861) p. 200.—C. *tectonaefolia* WALL. Cat. No. 1827 (1828), ex CLARKE in HOOK. f.- l.c. (1885) p. 567 sub. C. arborea.—C. *villosa* ROXB. Hort. Beng. (1814) p. 10, ex CLARKE in HOOK. f. Flor. Brit. Ind. IV (1885) p. 567 sub. C. arborea.— C. *farinosa* ROXB. ex CLARKE in HOOK. f. - l.c. (1885) p. 567 sub. C. arborea.—C. *vestita* WALL. ex CLARKE in HOOK. f. Flor. Brit. Ind. IV (1885) p. 567.— C. *vastifolia* DIELS. Flor. Cent.-China in Engl. Bot. Jahrb. Band. 29 (1901) p. 547.—C. *longipetiolata* MERR. Phil. Gov. Lab. Bur. Bull. XXIX (1905) p. 47.—C. *Maingayi* KING & GAMBLE in Kew. Bull. Misc. Inf. (1908) p. 106.— *Aganon umbellata* RAFIN, Sylva Tellur. (1838) p. 161.—*Tomex tomentosa* LINN. Flor. Zeyl. (1748) p. 24; LINN. Spec. Plant. I (1753) p. 118.—*Cornutia corymbosa* (not of BURM.) LAM. Dict. Enc. Bot. I (1783) p. 54.—*Tondi teregam* RAIUS Hist. Plant. II (1693) p. 1787.—*Illa* HERM. Zeyl. (1717 or 1726) p. 11.—*Arbor malabarica Illa dicta* BURM. Thes. Zeyl. (1737) p. 26.

Distribution: Brit-India! Siam! Malacca! Sumatra! Hongkong! Philippines! New- Guinea!

Var. α **typica** BAKH.— nov. var.—Tondi Teregam Raius (1693).—*Illa* HERM (1717 or 1726).— *Arbor malabarica Illa dicta* BURM. (1737).—*Tomex tomentosa* L. (1748 et 1753).—*Callicarpa tomentosa* (L.) MURR. (1774).—C. *arborea* ROXB. (1814),—C. *villosa* ROXB. (1814).—C. *Wallichiana* (not. of WALP.) MIQ. (1856).—C. *farinosa* ROXB. ex CLARKE (1885).—C. *tectoni olia* WALL. ex CLARKE (1885).—C. *vestita* WALL. ex CLARKE (1885).—C. *lanata* GAMBLE ex CLARKE (1885).—C. *Maingayï* KING-GAMBLE (1908).—Folia adulta subtus tomentosa, incana; 15-40 c.M. longa, 7-15 c.M. lata; *cymi* magni, pedunculo petiolum aequante vel longiore; *calyx* dense tomentosus superne glabratus, raro subglabrescens; *corolla* extus glabra, vel dorso laciniarum subfarinosa; *ovarium* setaceum vel sparse pilis stellatis tomentosum, sparse glandulis punctatum.

Distribution: Ceylon! Himalaya! Nepal! Sikkim! Assam! Bengal! Burmah! Siam! Malacca! Sumatra!

Var. β **lanata** (L.) BAKH.— nov. var.—C. *Callicarpa lanata* L. (1767).— *Cornutia corymbosa* (not of BURM.) LAM. (1783).—C. *Tomex* POIR. (1811).— C. *Wallichiana* WALP. (1848).—C. *integerrima* CHAMP. ex BENTH. (1853).— C. *cana* (not of L.) DALZ. & GIBS. (1861).—C. *arborea* (not of ROXB.) MIQ. ex CLARKE (1885).—C. *vastifolia* DIELS (1901).—Folia adulta subtus dense et molle lanato-tomentosa canescentia; 10-30 c.M. longa, 3.5-15 c.M. lata; cymae magnae, pedunculo quam petiolus duplo breviore; *calyx* sparse tomentosus superne glabratus; corolla extus glabra vel dorso laciniarum subtomentosa; ovarium dense setaceum vel sparse pilis stellatis tomentosum, sparse glandulis punctatum.

Distribution: CEYLON! Deccan! Himalaya! Nepal! Bhotan! Burmah! Bhamo! Hongkong! China!

Var. γ **longipetiolata** (MERR.) BAKH.— nov. var.— *Callicarpa longipetiolata* MERR. (1905)— Folia adulta subtus dense tomentosa, tomento in sicco subpersistente flavido-pulverulento, 4-10 c.M. longa, 1.5-4.5 c.M. lata; cymi parvi vel mediocres, pedunculo petiolo subduplo-triploque longiore; calyx dense pilis stellatis flavidis furfuraceus; corolla extus dorso laciniarum densissime sublanato-tomentosa; ovarium dense villosum et glandulis punctatum!

Luzon: ELMER No. 6266 and No. 14280.

Distribution: Philippines!

Var. δ **magna** (SCHAU.) BAKH.— nov. var.— *Callicarpa magna* SCHAU. (1847).— Folia adulta subtus dense tomentosa vel subfarinosa, mollia vel subrugosa, tomento in sicco subpersistente canescenti; 10-25 c. M. longa, 5-10 c. M. lata; cymi mediocres vel majusculi, pedunculo petiolum subaequante vel saepe majore, raro breviore; calyx glaber vel pilis sparsis stellatis; corolla extus subglabra vel dorso laciniarum velutina; ovarium glabrum raro sparse pilis stellatis vestitum, glandulis punctis crebris densissime tectum.

Luzon: ELMER No. 8193 (Geunsia straminea ELM.); ELM. No. 14513 and No. 16939 (C. sorsogonensis ELM.).

Distribution: Philippines.

10. **Callicarpa acuminata** ROXB. Flor. Ind. I. (1820) p. 408.— C. *nudiflora* HOOK. et ARN. Beech. Voy. (1841) p. 206.— C. *Reveesii* WALL. Cat. 1830 1828) ex WALP. Rep. Bot. Syst. IV (1844-1848) p. 125.

Distribution: S.-China! Canton! Lappas-Isl.! Kwantung! Hongkong! Hainan! Macao! Silhet! ? Tenasserim! ? Singapore!

11. **Callicarpa Roxburghii** WALL. Cat. No. 1833 (1828) ex WALP. Rep. Bot. Syst. IV (1844-1848) p, 127; SCHAU. in DC. Prod. Syst. Nat. XI (1847) p. 640.— C. *tomentosa* (not. of MURR.) WILLD. Enum. Plant. (1809) p. 158.— C. *longiloba* MERR. Phil. Journ. Sc. Bot. XIII (1918) p. 156.— A shrub or small tree; branchlets, cymes and petioles densely villous or woolly; leaves rather large, membranous, oblong or sublanceolate, base obtuse or cuneate, shortly attenuate, apex rather long acuminate, margins serrate-dentate, except at the base and the top, upper side, when adult, glabrous or with some stellate hairs, lower side softly white or greyish tomentose; pairs or nerves 10-15; 10-20 c. M. by 3.5-10 c.M.; petioles 1-2.5 c.M.; cymes rather small, globose-glomerulate, 2-4 c.M. long, 3-5 c.M. in diam.; peduncles short, 1.5-2 c.M. long; calyx tubular, densely floccose outside, 0.3-0.5 c.M. long; segments 4, lanceolate 0.20-0.25 c.M. long; corolla shortly exsert, 0.30-0.45 c.M., tube glabrous, segments 4, ovate, 0.10-0.12 c.M. long, 0.15-0.20 c.M. broad, densely villous outside; stamens 0.5-0.7 c.M.; anthers glandular, 0.07-0.10 c.M.; style 0.6-0.8 c.M. with subpeltate or obscurely 2-4-lobed stigma; ovary hairy and glandular; drupe somewhat hairy and glandular on the top, white when mature, 4-seeded.

Hongkong: HANCE No. 337; WEISZ No, 2588.

Distribution: S-China: Hongkong! Canton! Amoy! Kwangsi!

12. **Callicarpa macrophylla** VAHL. Symb. Bot. III (1794) p. 13 tab. 53.— C. *tomentosa* KOENIG ex VAHL. Symb. Bot. III (1794) p. 13 sub. C. macrophylla.— C. *incana* ROXB. Flor. Ind. I (1820) p. 407.— C. *cana* (not. of L.) GAMBLE Man. Ind. Timb. (1881) p. 283 ex CLARKE in HOOK. f. Flor. Brit. Ind. IV (1885) p. 568 sub C. macrophylla.— A shrub, 3-5 M. high; branchlets, cymes, petioles densely mealy or woolly; leaves rather large, coriaceous, oblong or sublanceolate, base obtuse or rounded, often subcordate, apex rather long acuminate, margins crenate vel obtusely serrate, except at the base and the top, upper side, when adult, densely hairy, the stellate hairs often stubbily broken, lower side softly white or greyish tomentose; pairs of nerves 10-15; 10-35 c.M. long, 3-18 c.M. broad; petioles 1-2 c.M.; cymes rather small, globose, 3-5 c.M. long, 3-10 c.M. in diam.; peduncles short, 1-2 c.M. long; calyx cupuliformous, densely floccose outside, 0.10-0.15 c.M. long.; shortly 4-toothed, teeth subincurved, 0.01-0.015 c.M. long; corolla exsert 0.3-0.45 c.M., tube glabrous, 1½-2 times as long as the calyx, lobes 4, ovate, 0.1-0.12 c.M. long, 0.15-0.20 c.M. broad, glabrous or with some hairs outside; stamens 0.5-0.6 c.M.; anthers glandular, 0.07-0.10 c.M.; style 0.6-0.7 c.M., with subpeltate or obscurely 4-lobed stigma; ovary glabrous, glandular; drupe glabrous, white when mature, 4-seeded.

Distribution: Brit.-India! Malabar! Himalaya! Nepal! Assam! Silhet! Bengal! Burma! Hainan! Hongkong! China! N.-Guinea (WARB.! LAUTERB.)!—Mascarenes (SCHAU.)! Réunion (CORDEM)!

13. **Callicarpa cuspidata** ROXB. Flor. Ind. I (1820) p 409.— C. *rubella* LNDL. Bot. Reg. XI. (1825) t. 883.— C, *acutidens* SCHAU. in DC. Prod. Syst. Nat. XI (1847) p. 645.-- C. *sessilifolia* WALL. Cat. 1837 (1828) ex WALP, Rep. Bot. Syst. IV (1844-1848) p. 130.— C. *tenuiflora* CHAMP. ex BENTH. in HOOK Journ. Bot. Kew. V (1853) p. 135.— C. *micrantha* VIDAL. Com. Flor. For. Filip. Phan. Cum. (1885)p. 187; Verb. 59.— (?) C. *psilocalyx* CLARKE in HOOK. F. Flor. Brit. Ind.IV (1885)p. 569.— C. *pilosissima* MAX. in Bull. Acad. Imp. Sc. Petersb. XXXI (1887)p. 76.— C. *caudata* MAX. in Bull. Acad. Imp. Sc. Petersb. XXXI (1887) p. 76.— C. *longipes* DUN. Journ. Linn. Sc. Bot. XXXVIII (1908)p. 363.— C. *lancifolia* MERR. Phil. Journ. Sc. Bot. X (1915)p. 70.— *Mamanira* RUMPH. Herb. Amb. IV (1750)p. 123 tab. 58.—A shrub, 0.7-2 (?-6) M. high; branchlets, cymes and petioles with a densely woolly or farinose texture of stellate hairs; leaves subcoriaceous, oblong or lanceolate, often subobovate, base usually deeply cordate, often obtuse or cuneate, apex rather long acute-acuminate, margins, acute-serrate or crenate-serrate, except at the base and the top, upper side, when adult, from more or less to densely hirsute with simple hairs, especially on the nerves, lower side densely white stellate-tomentose or somewhat woolly, rarely scarcely hairy; pairs of nerves 7-15; 10-20 c.M. long, 2-6 c.M. broad; petioles 0.1-0.5 c.M.;

cymes small, globose, 1.5-4 c.M. long, 1.5-5 c.M. in diam.; peduncles 0.5-2 c.M. long; calyx cupuliformous, densely flocccse outside, rarely with a few simple hairs, 0.10-0.15 c.M. long, minutely 4- toothed, teeth subincurvated, 0.02-0.05 c.M. long; corolla exsert, 0.20-0.32 c.M., tube twice as long as the calyx, lobes 4, ovate and rounded 0.10-0.12 c.M. long, 0.10-0.15 c.M. broad, glabrous or obscurely hairy outside; stamens 0.3-0.5 c.M.; anthers glandular, 0.05-0.10 c.M.; style 0.6-0.7 c.M., with subpeltate or obscurely 4-lobed stigma; ovary glabrous, glandular; drupe glabrous, purple when mature, 4-seeded.

Distribution: Java! Sumatra! Celebes! Moluccas! Philippines! Formosa (MAX)! China! Hongkong (BENTH.)! Canton (MAX.)! Burmah (KURZ.)! Himalaya (GAMBLE)! Assam (BENTH.)! Sikkim (FORB.- HEMSL.)! Brit-India!

14. **Callicarpa mollis** SIEB. et ZUCC. Flor Jap. Fam. Nat. (1844)p. 526; MIQ. Ann. Mus. II (1866)p. 99.— C. *Zollingeriana* SCHAU. in DC. Prod. Syst. Nat. XI (1847)p. 640.— C. *farinosa* SIEB. ex MIQ. Ann. Mus. II (1866) p. 99 sub. C. mollis.— C. *Shirasawana* MAKINO in Bot. Mag. Tokyo. Bot. Soc. XXIV (1910)p. 28.

Distribution: Japan!

15. **Callicarpa pendunculata** R. BR. Prod. Flor Nov. Holl. (1810) p. 513.—C. *dentata* ROTH. Nov. Plant. Spec. ex ROEM. & SCHULT. Syst. Veg. IV (1819) p. 98; ROTH. Nov. Plant. Spec. (1821) p. 81.— C. *americana* (not.. of L.) BŁANCO Flor. Fil. Ed. I (1837) p. 517.—C. *lanata* (neither of L. nor of VAHL.) WALP. Rep. Bot. Syst. IV (1844-1848) p. 127.—C. *bicolor* (not. of JUSS.) F. VILL. in BLANCO Fl. Filip. Ed. III Nov. App. (1845) p. 158.— C. *lanata* (neither of L. nor. of VAHL.) SCHAU. in DC. Prod. Syst. Nat. XI (1847) p. 644.—C. *formosiana* ROLFE, Form. Plants. in Journ. Bot. XI (1882) p. 358. C. *cana* (not of L.) WALL. Cat. 1834 (1828) ex CLARKE in HOOK. F. Flor. Brit. Ind. IV (1885) p. 569 sub C. pedunculata.—C. *tiliaefolia* TEYSM. et BINNEND, fide KURZ. ex CLARKE in HOOK. f. Flor. Brit. Ind. IV (1885) p. 569 sub C. pedunculata.—C. *Blancoi* ROLFE, Flor. Phil. Isl. in Journ. Linn. Soc. Bot. XXI (1885) p. 315.—C. *ovata* C.B. ROBINS. Phil. Journ. Sc. Bot. III (1908) p. 215.—C. *stenophylla* MERR. Phil. Journ. Sc. Bot. V (1910) p. 380.— A shrub, 2-4 M. high; branchlets, cymes and petioles densely and farinosely, yellowish stellate-hairy; leaves membranous, ovate or oblong, base obtuse or rounded, often more or less cordate, apex abruptly rather long acuminate, margins irregularly serrate-dentate, except at the base and often at the top, upper side, when adult, scattered with stellatte hairs, which afterwards are dropped stubbily, except on the nerves, rarely quite glabrous, lower side green, scattered with stellate hairs, farinose or subtomentose; pairs of nerves 7-12; 5-15 c. M, long, 3-9 c. M. broad; petioles 0.5-1.5 c. M.; cymes small, more or less globose, 2.5-3.5 c. M. long, 2-3.5 c.M. in diam; peduncles 1-2.5 c.M. long, inserted a little above the leaf-axil; calyx cupulifcrmous, scattered with ferruginous stellate hairs outside, 0.10-0.15 c. M. long, shortly 4-(often 5-6-) toothed, teeth subintrocurved, 0.02-0.03 c. M. long; corolla exsert, 0.30-0.37 c. M.

tube twice as long as the calyx, lobes 4, sometimes 5, ovate or rounded, 0.10 - 0.12 c. M. long, 010 - 015 c. M. broad; glabrous or obscurely mealy outside; stamens 0.4 - 0.5 c. M.; anthers glandular 0.07 - 0.10 c. M.; style 0.6 - 0.7 c. M.; with peltate, obscurely 4 - 5 lobed stigma; ovary glabrous, glandular; drupe glabrous, dark purple when mature, 4-seeded.

Distribution: Trop - Australia! New - Zealand! Polynesia! New-Guinea! Key-Isl.! Timor! Moluccas! Philippines! Formosa!

16. **Callicarpa japonica** THUNB. Flor, Jap. (1784) p. 60.— C. *dichotoma* (LOUR.) RAEVSCH Nom. Bot. (1797) p. 37.—C. *purpurea* JUSS. in Ann. Mus. Hist. Nat. Par. VII (1806) p. 67.— C. *Murasaki* SIEB. Ann. Soc. Hort. (year?) p. 25; SIEB. et ZUCC. Flor. Jap. in Abh. Bayer, Ges. IV. abt. III (1846) p. 156.—C. *Mimurazaki* HASSK. Cat. Hort. Bog. (1844) p. 136; SIEB et ZUCC. Flor. Jap. in Abh. Bayer. Ges. IV abt. III (1846) p. 156 sub C. Murasaki.— C. *gracilis* SIEB. et ZUCC. Flor. Jap. in Abh. Bayer. Ges. IV abt. III (1846) p. 154.—C. *longifolia* LAM. *Var brevipes* BENTH. Flor. Hongk. (1861) p. 270.— C. *Jamamurasaki* SIEB ex MIQ. Prol. Flor. Jap. in Ann. Mus. Bot II (1866) p. 98 sub C. purpurea.—C. *brevipes* (BENTH.) HANCE in Ann. Sci. Nat. 5 sér. Bot. V (1866) p. 233; Hance in Journ. Linn. Soc. XIII (1873) p. 116 (prav. C. *breviceps*).— C. *elegans* HAYEK in Just's Bot. Jahresb. 33 (1905) p. 8; FEDDE Rep. Nov. Spec. II (1906) p. 88.— C. *oligantha* MERR. Phil. Journ. Sc. Bot XIII (1918) p. 155.— (?) C. *glabra* H. J. L. Verb. Mal. Arch. (1919) p. 82.—C. *serrulata* ZIPP. ex H. J. L. Verb. Mal. Arch. (1919) p. 83 sub C. elegans.— C. *Sieboldii* ZIPP. ex H. J. L. Verb. Mal. Arch. (1919) p. 85 sub C. purpurea.—*Porphyra dichotoma* LOUR. Flor. Cochin I (1790) p. 70.— A. shrub, 0.5-2 M. high.; branchlets, cymes, petioles, scattered with furfuraceous stellate hairs, afterwards subglabrous; leaves menbranous, ovate-oblong or subobovate, base acute or cuneate, apex more or less acute or acuminate, margins serrate-dentate or crenulate, except at the base and the apex, both sides glabrous, except on the middle nerve, lower side densely glandular, pairs of nerves 4-10; petioles 0.15-1.50 c.M.; cymes small, 2-3-chotomous, 1-5 c.M. long, 1-5 c.M. in diam.; peduncles 0.15-2 c.M.; calyx cupuliformous, glabrous, 0.07-0.12 c.M. long, obscurely 4-toothed or subtruncate; corolla exsert, lobes 4, ovate or rounded, 0.10-012 c.M. in diam., glabrous, papillose or densely glandular; stamens 0.30-0.40 c.M.; anthers glandular, 0.05-0.07 c.M.; style 0.4-0.5 c.M., with subpeltate, or obscurely 2-lobed stigma; ovary glabrous, glandular; drupe glabrous, purple when mature, 4-seeded.

Distribution: Japan! Corea! China! Hongkong! Cochin-China! Philippines!

Var. α **typica Bakh.**— nov. var.— C. *japonica* THUNB. (1784)— C. *Mimurazaki* HASSK. (1844). – C. *Murasaki* SIEB. (1846) — Folia petiolata elliptico-oblonga, raro subrhomboidea, subabrupte attenuato-acuta, grosse serrata, subtus sparse resinis punctatis, 3-15 c.M. longa, 1.5-7 c.M. lata; petiolus 0.2-1.5 c.M. longus; cymi 2-3-chotomi, 1.5-5 c.M diam.; mediocriter pedunculata; corolla alba, 0.30—0.40 c.M., tubo calyce 2-3-plo longiore; stamina antheris oblongis 0.15—0.20 c.M. loculis per totam longitudinem aut tantum apice et basi poris obliquis dehiscentibus.

Distribution: Japan! Corea! China!

Var. β **dichotoma** (LOUR) BAKH. - nov. var.— C. *oligantha* MERR. (1918).— *Porphyra dichotoma* LOUR. (1790).— C. *dichotoma* (Lour) Raevsch. (1797).— C. purpurea Juss. (1806).— C. *gracilis* SIEB. et ZUCC. [1846].—C. *longifolia* LAM. *var brevipes* BENTH. [1861].— C. *Jamamurasaki* SIEB ex MIQ. [1866].—C. *brevipes* [BENTH.] HANCE [1866].— C. *elegans* HAYEK [1905].— C. *Sieboldii* ZIPP. ex H.J.L. [1919].—C. *serrulata* ZIPP. ex H.J.L. [1919].—[?] C. *glabra* H.J.L. [1919].— Folia brevissime petiolata vel subsessilia, ovato-oblonga, lanceolata vel subobovata, sensim vel subabrupte acuminata, serrulata vel crenulata, subtus dense resinis punctatis subimpressis, nervis glabris vel subfarinosis; petiolus 0.15 - 1 c.M. vel subnullus; cymi dichotomi, 1 - 2. 5 c.M. diam., breviter pedunculati vel subsessiles; corolla rosea vel purpurea, 0.20 - 0.35 c.M., tubo calyce $1^{1}/_{2}$ - 2 plo longiore; stamina antheris ovatis vel oblongis 0.05 - 0.07 c.M., longitudinaliter dehiscentibus.

Distribution: Japan! Corea! China! Cochinchina! Philippines!

17. **callicarpa longifolia** LAM. Enc. Méth. Bot. I [1783] p. 563.— C. *lanceolaria* ROXB. Flor. Ind. I [1820] p. 409.— C. *albida* BL. Bijdr. Flor. Ned. Ind. 14e st. [1826] p. 818. — C. *Roxburghiana* SCHULT. Syst. Mant. III [1827] p. 54.— C. *attenuata* WALL. ex WALP. Rep. Bot. Syst. IV [1844-1848] p. 129.— C. *oblongifolia* HASSK. and *Var. acuminatissima* HASSK. Cat. Plant. Hort. Bot. Bog. [1844] p. 136; HASSK. Plant. Jav. Rar. [1848] p. 490.—C. *Blumei* ZOLL. ET MOR. Syst. Verz. [1845-1846] p. 53 ex H.J.L. Verb. Mal. Arch. [1919] p. 88 sub C. longifolia LAM.— C. *cuspidata* [not of ROXB.] HASSK. Plant. Jav. Rar. [1848] p. 491.— C. *rhynchophylla* MIQ. Flor. Ned. Ind. II [1856] p. 888.—C. *dentata* [not of ROTH] ROXB. fide WALL.— C. *cana* [not of L.] WALL. Cat. 1834 [1828] [partly] ex CLARKE in HOOK. f. Flor. Brit. Ind. IV [1885] p. 570 sub C. longifolia LAM.— (?) C. *dolichophylla* MERR., Phil. Journ. Sc. Bot. VII [1912] p. 339.— C. *attenuifolia* ELM. Leafl. Phil. Bot. VIII [1915] p. 2870.—C. *virens* REINW; C. *javanica* ZIPP. ex H.J.L., Verb. Mal. Arch. [1919] p. 88 sub C. longifolia LAM.— *Amictonis japonica* RAFIN. Sylv. Tellur. [1838] p. 161.—*Hedyotis arborescens* NORONHA in Verh. Bat. Genootsch. V [1790] p. 17 ex MIQ. Flor. Ned. Ind. II [1856] p. 888 sub C. longifolia LAM.— (?) *Mamanira alba* RUMPH. Herb. Amb. IV [1750] p. 124 t 49.

Forma α **subglabrata** SCHAU. in DC. Prodr. Syst. Nat. XI (1847) p. 645.— A slender shrub, branchlets, cymes and petioles almost glabrescent; leaves lanceolate, minutely denticulate-serrulate to almost entire, upper side glabrous when aldult, lower side almost glabrous, except on the nerves; cymes slender, lax, rather long petioled; calyx scarcely hairy or glabrous; corolla rose or whittish, scarcely pubescent outside; ovary densely glandular, not hairy.

Forma β **floccosa** SCHAU. in DC. Prod. Syst. Nat. XI (1847) p. 645.— A stout shrub or small tree; branchlets, cymes and petioles densely floccose hairy; leaves oblong or broadly-lanceolate, distinctly serrulate-denticulate, upper side sparsely stellate-hairy when adult, or glabrescent, except on the nerves, lower side rather densely floccose; cymes stout, globose, usually rather short-petioled; calyx densely and floccosely stellate-hairy; corolla purple or rose, densely woolly outside.

Distribution: Brit-India: eastern Bengal! Silhet! Khasia! Burma! Malacca! Penang! Malay Archipelago! Christmas-Isl.! Trop. Australia! New-Guinea! Phillippines! China and Japan!

It is not possible to distinguish distinctly the numerous varieties, which exist between the above-mentioned two extreme forms.

Species, doubtful or unknown to me:

18. **Callicarpa denticulata** MERR. Phil. Journ. Sc. Bot. III (1908) p. 430.
Distribution: Philippines!

19. **Callicarpa Horsfieldii** TURCZ. Bull. Soc. Imp. Nat. Mosc. XXXVI. III. [1863] p. 217.
Distribution: Java!

This doubtful species perhaps is to be considered as an abnormal form of *C. longifolia Lam* β *floccosa* SCHAU.

20. **Callicarpa lanata** ZIPP. ex SPAN. Linnaea 15 [1841] p. 330;
Distribution: Timor!

Perhaps this species is identical with *C. cana* or *C. cuspidata* ROXB.

21. **Callicarpa lobata** CLARKE in HOOK. f., Flor. Brit. Ind. IV (1885) p. 566. = [?] C. *tomentosae* [L.] MURR. forma.
Distribution: Nepal!

22. **Callicarpa trilobata** LOUR., Flor. Cochin. I [1790] p. 70.
Distribution: China; Cochin-China!

23. **Callicarpa umbellata** LOUR. Flor. Cohin. I (1790)p. 70 = [?] Premna spec.
Distribution: Cochin-China!

Excluded species:

24. **Callicarpa lanata** LAM. ex STEUD. Nom. Bot. I (1840)p. 257 = *Premna lanata* STEUD. = *Premna tomentosa* WILLD.

25. **Geunsia fastuosa** (R. BR.) RAFIN. Flor. Tellur. IV (1838)p. 61 = *Hypoestes fastuosa* R. BR.

SCHIZOPREMNA BAILLON (auctore H. J. L.)

Hist. d. Pl, XI, 119 (1892); Verb. 92.
Distribution: Timor!

1. **Schizopremna timorensis** BAILL. l. c.; Verb. 93.
Distribution: Timor!

Certainly BAILLON'S description of the genus is a very incomplete one, so that we can not decide, if the genus really is a good one, and thus is to be retained.

There are no indications at all, that the plant is found back ever since, and we must stipulate the possibility that it either belongs to *Premna*, or even not belongs to the *Verbenaceae* (it might be a *Labiata*). But whatever may, finally, be the decision in the matter, we may draw the attention to the apparent consimilarity with *Premna cauliflora* from Borneo - described by STAPF in the Transact. of the Linn. Soc., Ser. II, IV, 215, 1894 - a species which, as we already mentioned on p. 124 of our „Verb," in several points differs from the typical *Premna*.

9. TECTONA L. f. (auctore H. J. L.)

Suppl. 20, 151 (1781); Verb. 93.

Distribution: British India! Malay Peninsula! and Archipelago!, Philippines!

1. a. Leaves 23-55 by $12^1/_2$-37 c.M.; petioles 1.6-5 c.M.; tomentum floccose or ± none.
   b. Leaves 8-15 by 3-6 c.M.; petioles 0.5-0.7 c.M.; tomentum minute. . . . . 1. **T. philippinensis.**
2. a. Branchlets stellately floccose on all parts; leaves opposite 23-55 by 22-37 c.M.; petioles $2^1/_2$-5 c.M.; panicles 40 c.M. long, 35 c.M. in diam.; calyx-teeth obtuse; throat of corolla glabrous; corolla white . . . . . . 2. **T. grandis.**
   b. Branchlets subglabrous; leaves 24 by $12^1/_2$ c.M.; petioles 1.6 c.M.; usually ternate; panicles 15-30 c.M. long; calyx-teeth acute; throat of corolla villous; corolla blue . . . . 3. **T. Hamiltoniana.**

1. **Tectona philippinensis** MERRILL Phil. Journ. Sci. Bot. V. 227, (1910); Verb. 94. — *T. philippinensis* BTH. et HOOK. Gen. Pl. II, II, 1152, nom. nud. — FRUIT included in the enlarged calyx.

Distribution: Luzon!

2. **Tectona grandis** L. f., Suppl. 151 (1781) — Verb. 95 — *T. Theca* LOUR., Fl. Cochinch. 137 (1790) — Lower side of leaves yellowish or reddish stellate-tomentose, sometimes subglabrate; flowers 0.3-0.6 c.M. long, 0.3-0.7 c.M. in diam.; calyx light-yellow or light-green, 0.3-0.45 (-0.6) c.M., with 5,6 or 7 lobes; corolla 5-7-merous, white with rose on the lobes, which are erect or reflexed; stamens with white filaments and yellow anthers; style and stigma yellow-white; ovary dirty white-rose.

In Herb. Bog. from: Java!, Madura!, Amboyna!, Deli! (cultiv.)! Celebes!

Forma **abludens** KDS. et VALETON, Bijd. Booms. Java n. 7, 171 and Atl. d. Baumarten II, fig. 204; COSTERUS and SMITH, Studies in tropical Taratology, Ann. d. Jard. bot. Btz. 2e Ser,, Vol. IX, 113, fig. 17-18; with abnormally deformed leaves. Mr. SMITH informs us, that in the case of abnormal leaves, all leaves of a tree are deformed.

Distribution: Brit. India! Malay Peninsula! Sumatra! Java! Madura! Borneo! Philippines! Bali! Sumbawa! Kangean! Celebes! Amboyna! Marianne-islands!

3. **Tectona Hamiltoniana** WALL. (1832) Pl. As. Rar. III, 68, t. 294 (1830-32); Verb. 96 — *T. ternifolia* HAM. ms. — Pairs of nerves in the leaves 4-8; leaves 7-24 by 4-$12^1/_2$ c.M.; petioles 1.2-1.6 c.M.; the cluster of branched hairs at the foot of the inflorescence, mentioned on p. 96 of our dissertation, appears to have been an abnormality. The specimens, seen in Herb. Bog. and the plate in WALLICH'S Plantae Asiaticae Rariores, III, 68, t. 294 show quite normally shaped branches and panicles; corolla pale blue with violet throat; calyx enlarged in fruit (including it), up to 1.1 c.M.

Distribution: Malay Peninsula! Burma! Ava!

10. **TEYSMANNIODENDRON** KDS. (auctore BAKH.).

Ann. Jard. Bot. Buitenz. XIX (1904) p. 19; Verb. 97.

Distribution: Malay Archipelago! Malacca! Philippines!

a. Leaves 3-4-foliolate; petiole 1.5-10 c.M. long, not winged; corolla with the larger lobe broadly spathulate; fruit with a 0.2-0.4 c.M. thick pericarp.

1. **T. bogoriense.**

b. Leaves 5-7 foliolate; petiole 7-30 c.M. long, broadly winged; corolla with the larger lobe broadly oblong; fruit with a 0.5-1 c.M. thick pericarp.

2. **T. pteropodum.**

1. **Teysmanniodendron bogoriense** KDS. in Ann. Jard. Bot. Buitenz. XIX (1904) p. 19, taf. IV pl. II-III.

Distribution: Borneo!

2. **Teysmanniodendron pteropodum.** (MIQ.) BAKH.— nov. comb. — *Vitex pteropoda* MIQ. Flor. Ned. Ind. Suppl. Sumatra (1860) p. 242 et p. 567.—*V. peralata* KING in Kew Bull. Misc. Inf. (1908) p. 112.— *V. philippinensis*- MERR. Rep. Invest. Java in Bull. I For. Bur. (1903) p. 52.—Arbor 15-35 c.M. alta, trunco 0.25-0.50 c.M. diam.; ramuli crassi, tetragoni lateribus canaliculati, aetate costato-striati, cortice griseo vel pallide brunneo; *folia* petiolis longis crassisque suffulta, magna, digitatim composita, foliolis 5-7 inaequalibus, coriacea, in sicco rigida; foliola breviter petiolulata, lanceolata vel lanceolato-obovata, basi cuneata vel acute in petiolulum subalato attenuata, apice abrupte breviterque acuminata vel obtusa, integerrima, vel vulgo apice ± lacerato, margine recurvata, utrinque glaberrima, sparse resinoso-punctata, novella purpurea, adulta supra atro-viridia, subtus pallide virescentia, tactu asperula. in sicco epidermide stomatoso-bullulosa, nervis secundariis utrinque 8-16, subtus cum costa prominentibus, supra canaliculatis, reticulatione superne prominula, subtus subinconspicua; 10-55 c. M. longa, 5-19 c. M. lata, foliolo centrali maxima, cetera gradatim minora, exteriore minima; *petiolulo* 0.5-3 c. M. longo vel ±O, basi pulvinato, superne lato-sulcato, vulgo alato; *petiolo* 7-30 c. M. longo, crasso lateraliter compresso, glabro, late foliaceo-alato, basi et apice pulvinato, basin versus late sulcato; ala inferne latior, basi lato-rotundata, subcordata vel auriculata, utraque ala petioli 1.5-10 c. M. lata, apicem versus sensim vel abrupte acuminata, rariter subcordato-auriculata, cum foliis viridis, glabra, irregulariter nervosa. Inflorescentiae terminales, solitariae vel 3-5-flabellatim-fasciculatae, flabellato-paniculatae, 20-70 c. M. longae, 15-30 c. M. latae; pedunculi atro-purpurei aetate flavido-viridescentes, compresse tetragoni, canaliculati, apice dilatato-complanati, glabri, sparse lenticellati, 5-20 c. M. longi, fructiferi incrassati, nutantes. Paniculae partiales pedunculis 1-10 c. M. longis inclusis, semel atque interum flabellatim ramosae, ramis 3-5-nis, ultimis in paniculam angustam desinentibus, 5-20 c. M. longae; cymae parvae, bracteola suffultae, solitariae vel geminatae, oppositae vel alternae, trichotomae, 1-multiflorae, 0.7-2.5 c. M.

longae, pedunculo 0.15-1.20 c. M. longo insidentes, bracteae subalbidae, pallide virescentes vel purpurei, pseudo-sessiles, ovatae, subventricoso-alata, basi attenuatae, apice breviter acutae, utrinque subglabri, vel extus sublepidoti, resinoso-punctatae, 0.3-1 c. M. longae, 0.3-0.7 c. M. latae, bracteolae cymarum parvae, sessiles, oblongae vel lanceolatae, acuminatae, purpureae, glabrae vel lepidotae, 0.2-0.5 c. M. longae, 0.05-0.10 c. M. latae; flores parvi, brevissime pedicellati vel subsessiles, suaveolentes, bracteolulis 1-2 purpureis glabris, 0.05-0.10 c. M. longis, lanceolatis, deciduis suffultae; calyx campanulatus, 5-, raro 4-dentatus, subbilabiatus, labio superiore lobis 3 raro 2, labio inferiore lobis 2 majoribus, dentibus acutis 0.07-0.15 c. M. longis, extus purpureus vel roseus, sparse fulvo-pubescens vel subglabrescens, intus glaber, resinoso-punctatus; 0.15-0.35 c. M. altus, 0.20-0.25 c. M. diam; fructifer valde augens, flavo-viridis, hypocrateriformis, margine sinuato-undulato, recurvo, 1.5-3 c. M. diam.; corolla violacea, fauce brunneo-striata, tubo subcupuliforme tubuloso, calyce 2-3-plo longiore, inferne (pro tertia parte) glabro, superne pubescente, intus infra basin staminum glabro, superne sparse longeque villoso, utrinque resinoso-punctato, 0.5-0.8 c.M. longo, 0.25-0.40 c.M. diam.; limbo subbilabiato, labio superiore 2-lobo, lobis ovatis, vel lato-oblongis, acuminatis, labio inferiore 3-lobato, lobis lateralibus ovato-oblongis, lobis labii superioris fere similibus vel iis latioribus, albidis, reflexis, 0.25-0.40 c. M. longis, 0.15-0.30 c. M. latis, uitrinque sparse pubescentibus, lobo medio multo majore, late oblongo, apice obtuso vel rotundato, supra coeruleo, basi subaurantiaco, utrinque dense puberulo, resinoso-punctato, 0.3-0.6 c.M. longo, 0.2-0.5 c.M. lato; stamina 4, didynamia, filamentis albis vel pallide violaceis, subulato-filiformibus, pro 2/3-3/4 parte sparse longeque albido-villosis, apice glabris, incurvis supra medium tubi insertis, semi-exsertis 0.4-0.7 c. M. longis, antheris atro-purpureis mox atratis, opacis, glabris, supra medium dorsifixis, thecis ellipsoideis, paulo divergentibus, eglandulosis, 0.07-0.12 c.M. longis, polline albo; stylus teres filiformis, glaber, breviter exsertus, subincurvatus, 0.8-1 c. M. longus, stigmate breviter bifido, lobis divergentibus; ovarium sessile, depresse globosum, apice villosum, ceterum glabrum, resinoso-punctatum, 2-loculatum, loculis 2-ovulatis, imperfecte 2-locellatis, ovulis supra medium aut prope apicem loculi pendulis; fructus magnus, siccus, indehiscens, exocarpio lignoso, 0.5-1 c.M. crasso, abortu 1-locularis, 1-spermus, ovoideo-conoideus vel ovato-oblongus, maturitate brunneus, opacus, sulcato-costatus, 3-5 (?-1.8, ex KING) c.M. longus, 3-4.5 (?-1.2, ex KING) c. M. diam.; semen apicem versus affixum et pendulum, ovoideum vel globosum, album, exalbuminosum, 1.5-2.5 c. M. diam.; testa membrancea, albicans vel lactea; embryo rectus, cotyledonibus crassissimis orbicularibus ovoideis, apice irregulariter brevissimeque emarginatis, extus reticulato-rimosis; plumula inconspicua; radicula brevis vix prominula.

Distribution: Sumatra! Banka! Borneo! Malacca! Philippines! Coll. Herb. Bog.:

Sumatra: (TEYSM. No. 3680; KOORD. No. 10481, No. 10483).—Banka (TEYSM.—Medang Poedjie—fruit).—Borneo (BECCARI No. 429);-Philippines (ELM. No. 7096; Fénix No. 1326-*Vitex philippnensis Merr*).

11. XEROCARPA H. J. L. (auctore H. J. L.)

Verb. 98. (1919).
Distribution: New Guinea (N.-E.-)
1. **Xerocarpa avicenniaefolia** H. J. L., l.c.
Distribution: New-Guinea (N.-E.-)

12. PREMNA L. (auctore H. J. L.)

Mant II, 154 (1771); Verb. 100.

Distribution: in the warmer regions of the old world.

1. a. Calyx regularly 4-toothed or subtruncate, more or less 2-lipped; the lips entire or more or less 2—toothed (Sect. I Gumira HASSK.) 2
b. Calyx more or less regularly 5-toothed. sometimes subtruncate, more or less 2-lipped (Sect II Premnos HASSK.) 47
2. a. Calyx 2-lipped, both lips entire or nearly so 3
b. Calyx 2-lipped, 1 lip 2-toothed, the other entire or nearly so 9
c. Calyx subequally 4-toothed or subtruncate 26
3. a. Cymes in panicles of interrupted spikes; flowers sessile, in glomerules; leaves subsessile, membranous. . . . . **1. P. Derryana**
b. Cymes in corymbose panicles, leaves petioled or sessile 4
4. a. Leaves small, 5 c.M. long; petioles $1^1/_4$ c.M. . . . **2. P. mariannarum**
b. Leaves larger, 8-28 c.M. long; petioles 1.2-12 c.M. 5
5. a. Corymbs small, $7^1/_2$ c.M. in diam.; calyx glabrous or nearly so; corolla-tube 0.5 c.M., sparsely villous within . . . . **3. P. cordifolia**
b. Corymbs larger, 5-27 c.M. in diam.; calyx pubescent, 0.15-0.3 c.M.; corolla-tube 0.3-0.45 c.M., densely villous within 6
6. a. Leaves chartaceous; calyx sometimes pseudo-4-toothed; corolla-tube glabrous without; lobes subequal, pubescent and glandular without. **4. P. parasitica**
b. Leaves membranous 7
7. a. Corolla glabrous without; corymbs reaching 13×11 c.M. . **6. P. Ruttenii**
b. Corolla pubescent without; corymbs reaching 30×20 c.M. 8
8. a. Leafbase truncate or cordate . . . . **5. P. sterculifolia**
b. Leafbase decurrent. . . . . **7. P. decurrens**
9. a. Leaves coarsely crenate along the whole margin, except near the base; pubescent or subglabrate on both sides; calyx usually deeply and acutely 3-5-toothed; corolla-tube 0.45-0.55 cM. long, 0.1-0.15 cM. in diam. **33. P. angustiflora.**
b. Leaves entire or somewhat crenate towards the apex only; calyx with usually obtuse and short teeth, often 2 only 10
10. a. Leaves subsessile; cymes in panicles of interrupted spikes. **1. P. Derryana.**
b. Leaves petioled; cymes in corymbose panicles. 11
11. a. Leaves with cinerous-white epidermis, glabrous, barbellate in the axils of the nerves beneath. . . . . **8. P. alba.**
b. Leaves not white; glabrous or pubescent. 12
12. a. Lamina of leaves pubescent on one or on both sides. 13
b. Lamina of leaves glabrous on both sides, the nerves or their axils beneath often pubescent. 16

13. a. Leaves entire; corymbs 10-23 c.M. long, 9-25 c.M. wide 14
b. Leaves usually serrate towards the apex; corymbs $5^{1}/_{2}$-13 c.M. long 4-13 c.M. wide 15

14. a. Calyx 2-lipped, one lip entire or 2-toothed, the other entire; corolla pubescent without; leaves membranous. . . . **5. P. sterculifolia.**
b. Calyx 2-lipped, one lip entire or 3-toothed, the other 2-toothed; leaves chartaceous. . . . . **9. P. Peekelii.**

15. a. Calyx 2-lipped, one lip 1-toothed, the other entire or 2-toothed; corolla-tube 0.2 c.M. . . . . **10. P. Curranii.**
b. Calyx 2-lipped, one lip sometimes with 2 acute, usually with 2 obtuse teeth, the other sometimes entire, usually with 3 obtuse teeth; corolla-tube 0.4-0.5 c.M. . . . . **47. P. pubescens.**

16. a. Leaves $2^{1}/_{2}$-12 by $1^{1}/_{2}$-5.7 c.M.; corymbs 6-13 c.M. long, $2^{1}/_{2}$-(5-8) c.M. in diam.; peduncles 0.2-2.5 (—8) c.M. 17
b. Leaves $8^{1}/_{2}$-22 by 4-$8^{1}/_{2}$ c.M.; corymbs 10-15 c.M. long, 7-20 c.M. in diam., peduncles (0-) $2^{1}/_{2}$-$7^{1}/_{2}$ c.M. 23

17. a. Leaves 3-4 (-5) (in P. INTEGRIFOLIA sometimes more) -nerved; base subcordate, rounded or obtuse, sometimes subacute 18
b. Leaves 5-8-nerved, base cuneate, decurrent, sometimes subobtuse . . . 21

18. a. Leaves usually barbellate in the axils of the nerves beneath; pairs of nerves 4-6 19
b. Leaves not barbellate in the axils of the nerves beneath; pairs of nerves 3; corolla-lobes subequal . . . . **42. P. integrifolia.**

19. a. Leaves entirely glabrous on both sides, also on nerves and in their axils beneath; teeth of the lower lip of the calyx small, close to one another, somewhat elevated above the rest of the calyx. . . **11. P. borneensis.**
b. Leaves usually pubescent on the nerves, always barbellate in their axils beneath; teeth of the lower lip of the calyx rather large and not close to one another 20

20. a. Leaves $2^{1}/_{2}$-$5^{1}/_{2}$ (-7) by 1.5-3.3 (-$4^{1}/_{2}$) c.M., entire, 4-5 nerved; corolla distinctly 2-lipped; upper lip sometimes 2-lobed . . **12. P. congesta**
b. Leaves usually larger, often crenate towards the rounded or shortly acuminate apex; corolla subequally 4-lobed . . . . . . **42. P. integrifolia**

21. a. Teeth of the calyx broad and short, indistinct; base of the leaves decurrent; midlobe of the lower lip of the corolla broader than the lateral lebes . . . . **13. P. angustifolira**
b. Teeth of the calyx always large 22

22. a. Base of the leaves subobtuse, narrow; midlobe of the lower lip of the corolla narrower than the lateral lobes. . . . . . . **14. P. timoriana**
b. Base of the leaves cordate, truncate or subacute, usually broad; midlobe of the lower lip of the corolla broader than the lateral lebes **42. P. integrifolia**

23. a. Leaves 4-5-nerved, broadly elliptic, abruptely acuminate; base rounded or subcordate, 7-15 by $5^{1}/_{2}$-9 c.M.; petioles $2^{1}/_{2}$-5 c.M.; glandular beneath, glabrous in the axils of the nerves. . . . . { **15. P. ceramensis** / **16. P. punctulata**
b. Leaves 5-6-nerved, narrower, not abruptly acuminate; base acute or rounded; axils of the nerves usually barbellate beneath 24

24. a. Leaves membranous, when young, chartaceous afterwards, elliptical or ovate, sometimes pubescent on both sides; corolla-tube pubescent without . . . . **17. P. divaricata**
b. Leaves chartaceo-coriaceous; corolla-tube glabrous without 25

25. a. Lower bracts leafy, upper ones lanceolate; nerves glabrous **18. P. perakensis**
b. All bracts linear; nerves generally pubescent . . **42. P. integrifolia**

26. a. Leaves coarsely crenate or serrate 27
   b. Leaves entire or somewhat crenate or serrate towards the apex only . . 28
27. a. Teeth of the calyx acute, large, as long as or longer than the tube; corolla villous within . . . . 33. **P. angustiflora**
   b. Calyx truncate or with 4 minute teeth; corolla glabrous within 19. **P. cauliflora**
28. a. Calyx truncate or indistinctly 4-toothed 29
   b. Calyx very distinctly 4-toothed 31
29. a. Leaves 8-$25^1/_2$ by 6-14 c.M.; petioles $1^1/_2$-3 c.M.; corymbs 8-26 c.M. long, 11-24 c.M. in diam 30
   b. Leaves 8-14 by 3-5 c.M.; petioles 1-2 c.M.; areolate beneath; corymbs reaching 10 c.M. in length and in diam . . . . 20. **P. areolata**
30. a. Calyx truncate; stigma very shortly bifid . . . . 21. **P. Kunstleri**
   b. Calyx usually irregularly undulate; stigma long bifid; lobes capitate . . . . 43. **P. macrophylla**
31. a. Leaves glabrous on both sides, or pubescent only on the nerves or in their axils beneath 32
   b. Leaves pubescent on one or both sides 42
32. a. Leaves 10-30 by 5-20 c.M,; petioles 1-8 c.M. 33
   b. Leaves 3-10 by $2^1/_2$-5 (7) c.M.; petioles 0.5-3 c.M. 39
33. a. Leaf-apex gradually acuminate, base broadly cordate or rounded, widest beneath the middle; calyx membranous, with 4 sharp teeth 22. **P. adenosticta**
   b. Leaf-apex abruptly acuminate or acute, (sometimes gradually acuminate in P. INTEGRIFOLIA); widest across the middle or above it; calyx usually coriaceous. 34
34. a. Axils of the nerves usually barbellate beneath. . 42. **P. integrifolia**
   b. Axils of the nerves not barbellate benêath. 35
35. a. Corolla-tube as long as the calyx, 0.1-0.15 c.M.; leaves obovate-oblong . . . . 23. **P. oblongata**
   b. Corolla-tube longer than the calyx, 0.1 c.M. or more exserted. . . . 36
36. a. Leaves 10-30 by 10-15 c.M.; petioles $2^1/_2$-$3^1/_2$ c.M.; calyx 2-lipped, the lips entire or 2-toothed; corolla-tube 0.3 c.M., lobes pubescent and glandular, tube glabrous without. . . . . 4. **P. parasitica**
   b. Leaves 8-17 by 3-12 c.M.; petioles 1-3 c.M.; calyx 4-toothed or subtruncate. 37
37. a. Calyx distinctly acutely 4-toothed, not or indistinctly 4-ribbed, sparsely pubescent and glandular; leaves 10-$17^1/_2$ by 3-$15^1/_2$ c.M.; petioles 1.5-2.3 c.M.; style with shortly bifid stigma . . . . 24. **P. trichostoma**
   b. Calyx often truncate or indistintly 4-toothed, teeth obtuse; subglabrous, 4-ribbed; leaves 8-14 by 3-5 c.M.; petioles 1-3 c.M.; stigma long bifid, lobes 0.1 c.M. 38
38. a. Leaves areolate beneath. . . . . 20. **P. areolata**
   b. Leaves not areolate beneath. . . . . 25. **P. Williamsii**
39. a. Calyx hardly 4-toothed or subtruncate; stigmatic lobes 0.1 c.M. . . . 38
   b. Calyx with large teeth, which are $^1/_1$ or $^1/_2$ of the tube; stigmatic lobes shorter. 40
40. a. Calyx coriaceous, teeth 4, obtuse, ciliate. . . 26. **P. oblongifolia**
   b. Teeth of the calyx acute, sometimes subobtuse, not ciliate; one lip 2-toothed, the other 2-toothed or entire 41
41. a. Calyx subquadrangular; leaves 4-$7^1/_2$ by 2-4 c.M., 6-7-nerved; corymbs 4-12 c.M. long; corolla with 4 subequal lobes . . . . . 27. **P. Ridleyi**
   b. Calyx not quadrangular; leaves 4-6-nerved and larger, or, if as large, then 4-nerved; corolla 2-lipped. 22
42. a. Leaves 4-10 by 2-4 c.M.; petioles 1-$2^1/_2$ c.M.; ovate, base and apex acute . . . . 28. **P. rufidula**
   b. Leaves 9-24 by $6^1/_2$-14 c.M.; petioles 2-9 c.M. 43

43. a. Lobes of the corolla subequal, tube 0.1-0.3 c.M. 44
b. Corolla 2-lipped, tube 0.2 c.M.; leaves long acuminate, often serrate towards the apex. . . . . **10. P. Curranii**
44. a. Corolla-tube as long as or shorter than the calyx, 0.1 c.M.; leaves obovate-oblong. . . . . **23. P. oblongata**
b. Corolla-tube longer; 0.2 c.M. or more; leaves broader. 45
45. a. Corolla-tube 0.2 c.M.; calyx 0.1 c.M.; stigmatic lobes short, capitate; ovary pubescent and glandular at the top, ... **29. P. regularis**
b. Corolla-tube 0.25-0.3 c.M.; calyx 0.1-0.15 c.M.; stigmatic lobes long, subulate. 46
46. a. Leaves membranous, $6^{1}/_{2}$-15 by 5-12 c.M.; teeth of the calyx subobtuse, often not alternating with the corolla-lobes. . . **30. P. membranacea**
b. Leaves chartaceous, 12-26 by 7-9 c.M.; teeth of the calyx acute, alternating with the corolla-lobes. . . . . **31. P. rotundifolia**
47. a. Leaves glabrous beneath, or pubescent only on the nerves or in their axils, or along the margin. 48
b. Leaves pubescent beneath. 63
48. a. Leaves crenate, serrate or undulate, except close near the base. . . . 49
b. Leaves entire or minutely denticulate, sometimes crenate, serrate or dentate towards the apex. 51
49. a. Leaves membranous, coarsely undulate-dentate, sessile, 10-14 by 5-8 c.M.; corymbs 2-3 c.M. long, $1^{1}/_{2}$-2 c.M. in diam. . . . **32. P. sessilifolia**
b. Leaves chartaceous or coriaceous, petioled, corymbs larger, ... 50
50. a. Base of leaves decurrent, margins coarsely crenate; corolla tube 0.45-0.55 c.M. long, 0.1-0.15 c.M. in diam.; teeth of calyx large, acute. **33. P. angustiflora**
b. Base of leaves cordate or subcordate, margins dentate; calyx 2-$2^{1}/_{2}$ c.M. (!?). . . . . **34. P. littoralis**
51. a. Leaves 3-10 bij $2^{1}/_{2}$-5 c.M.; petioles 1-4 c.M. 52
b. Leaves 10-27 bij 5-15 c.M.; petioles $1^{1}/_{2}$-8 c.M. 55
52. a. Corolla 0.3-0.4 c.M. 53
b. Corolla 0.6-0.7 c.M. 54
53 a. Upper lip of corolla 2-lobed, lobes rounded; lower lip 3-lobed, midlobe rounded, lateral lobes subacute, deltoid . . **35. P. benguetensis.**
b. Upper lip of corolla entire. 22
54. a. Upper lip of corolla entire or somewhat 2-lobed; leaves usually longer than 10 c.M. . . . . **36. P. flavescens.**
b. Upper lip of corolla deeply 2-lobed; leaves usually shorter than 10 c.M. . . . . **37. P. membranifolia.**
55. a. Corymbs 5-8 c.M. in diam 56
b. Corymbs 10-24 c.M. in diam 59
56. a. Corolla 0.3 c.M. . . . . **38. P. parviflora.**
b. Corolla 0.5-0.7 c.M. . . . . 56A.
56A. a. Corolla minutely pubescent without, 0.7; leaves 10-19 by 6-10 c.M.; petioles 1.5-4 c.M.; calyx 0.2 c.M. . . . . **39. P. nervosa.**
b. Corolla glabrous without. 0.5-0.6 c.M. 57
57. a. Throat of corolla glabrous or nearly so; leaves 10-18 by 6-12 c.M.; petioles 3-8 c.M. . . . . **40. P. paulobarbata.**
b. Throat of corolla villous 58
58. a. Leaves membranous; upper lip of corolla 2-lobed **37. P. membranifolia.**
b. Leaves chartaceous; upper lip of corolla entire. . **42. P. integrlifolia.**
59. a. Calyx deeply 2-lipped and toothed 60
b. Calyx hardly 2-lipped, subtruncate 62
60. a. Calyx deeply or distinctly 2-lipped 61
b. Calyx with 5 subequal large teeth, one sometimes larger **51. P. tomentosa.**
a. Lower bracts leafy; base of leaves attenuate . . **41. P. wrayi.**

b. All bracts linear; base op leaves broad, usually rounded or cordate . . . . **42. P. integrifolia**

62. a. Leaves 8—$25^1/_2$ by 6—$14^1/_2$ c.M.; petioles 1—2 c.M.; corymbs 8--26 c.M. long, 11--24 c.M. in diam.; peduncles $2^1/_2$--11 c.M.; stigmatic lobes capitate; drupe with large central cavity. . . . . . **43. P. macrophylla**

b. Leaves 7--15 by $4^1/_2$—6 c.M.; petioles 1—4 c.M.; corymbs 10—$17^1/_2$ c.M. in diam.; stigmatic lobes subulate . . . . **36. P. flavescens**

63. a. Leaves 3—8 by 2—5 c.M.; petioles $^1/_2$—$1^1/_2$ c.M. 64

b. Leaves 10—35 by 7--20 c.M.; petioles 3--10 c.M. 70

64. a. Leaves entire 65

b. Leaves partly or totally crenate, serrate, or dentate 69

65. a. Petioles $^1/_2$—$1^1/_2$ c.M. 66

b. Petioles $1^1/_2$—6 c.M. 68

66. a. Leaves 3—6 by 2—$3^1/_2$ c.M.; base cordate or rounded, apex acute; calyx 0.3 c.M.; corolla pubescent without. . . . . **44. P. depauperata**

b. Leaves 5--15 by 2.7--5 c.M.; base acute or subrounded, apex obtusely acuminate or acute; calyx 0.1--0.15 c.M.; corolla-tube glabrous, lobes somewhat pubescent without. 67

67. a. Leaves $6^1/_2$--8 by 4--5 c.M.; relatively broad; corolla-lobes somewhat pubescent without . . . . **45. P. leucostoma**

b. Leaves 5--15 by 2.7—5c.M., relatively narrow; corolla-lobes glabrous without . . . . **46. P. latifolia** *Var.* d

68. a. Teeth of calyx acute, corolla glabrous without . **36. P. flavescens**

b. Teeth of calyx obtuse, corolla more or less pubescent **47. P. pubescens**

69. a. Teeth of calyx obtuse; margins of leaves coarsely crenate; corolla-tube 0.45--0.55 c.M. long. 0.1--15 c.M. in diam. . . . **33. P. angustiflora**

b. Teeth of calyx obtuse; margins of leaves serrate or denticulate towards the apex only . . . . **47. P. pubescens**

70. a. Tomentum of the leaves beneath principally simple 71

b. Tomentum of the leaves beneath principally stellate 74

71. a. Corolla-tube 0.4-0.55 c.M., pubescent without; leaves often crenate or serrate. 69

b. Corolla-tube 0.15-0.3 c.M., glabrous without; leaves entire 72

72. a. Base of leaves subobtuse, acute or attenuate; leaves 2.7-6 c.M. broad; petioles $^1/_2$-$1^1/_2$ c.M. . . . . **46. P. latifolia** *Var.* d

b. Base of leaves rounded or cordate; leaves $4^1/_2$-16 cM. broad, petioles 1-6 c.M. 73

73. a. Leafbase rounded, leaves ovate or obovate, 9-$12^1/_2$ by $4^1/_2$-$5^1/_2$ c.M.; petioles 1.3-4 c.M.; corolla 0.7 c.M.' tube 0.5 c.M. . . . **36. P. flavescens.**

b. Leafbase cordate or subcordate, broad; leaves rotundate or hastate, 9-22 by 3.3-16 c.M.; petioles 1-7 c.M.; corolla 0.4-0.45 c.M., tube 0.3-0.35 c.M. 73A.

73A. a. Leaves usually hastate, acumen long tapering and obtuse, base suddenly decurrent, sometimes ovate-cordate-rotundate; pairs of nerves 6-9; calyx with acute teeth . . . . **48. P. acuminata.**

b. Leaves ovate-cordate-rotundate, base not decurrent, apex acute; pairs of nerves 5-6; calyx with usually obtuse teeth, one lip sometimes subentire **9. P. Peekelii**

74. a. Teeth of calyx small, $^1/_2$ or $^1/_6$ of the lengh of the calyx 75

b. Teeth of calyx large, $^1/_2$ of the length of the calyx or more 77

75. a. Corolla glabrous without; lobes pubescent within; leaves with petioles reaching 15 c.M.; corymbs shorter than the leaves . . **49. P. Goeringii**

b. Corolla pubescent without; lobes glabrous within or nearly so . . . 76

76. a. Leaves abruptly acuminate, 4-6-nerved, 9-20 by 7-12 c.M.; petioles $2^1/_2$—6 c.M. **50. P. stellata**

b. Leaves gradually acuminate, 6-10-nerved, 10-35 by 7-20 c.M.; petioles $2^1/_2$-10 c.M. **51. P. tomentosa**

77. a. Corolla glabrous without; lobes pubescent within; leaves with petioles reaching 15 c.M; corymbs shorter than the leaves. . **49. P. Goeringii**

b. Corolla pubescent without, lobes glabrous within; leaves 11-30 by 8-20 c.M. petioles 1 $^1/_2$—8 c.M. . . . . 78.

78. a. Leaves gradually subobtusely acuminate, often denticulate, sparsely pubescent or subglabrate beneath; calyx with 4 equal teeth and 1 larger one, not or indistinctly 2-lipped, 0. 2 c.M. . . . . 51 **P. tomentosa.**

b. Leaves more or less abruptly and acutely acuminate, entire, stellate-tomentose beneath; calyx 2-lipped, 0.35 c.M. . . . . 52. **P. Cumingiana.**

Doubtful species: . . . . 53. **P. Ledermanni.**
54. **P. papuana.**
55. **P. populifolia.**

1. **Premna Derryana** KING et GAMBLE, Kew Bull.107 (1908); Verb. 110.
Distribution: Malay Peninsula!

2. **Premna mariannarum** SCHAUER, DC., Prodr. XI, 632 (1847); Verb. 111. (see observation).
Distribution: Marianne - islands!

3. **Premna cordifolia** ROXB., Fl. ind. III, 78 (1832); Verb. 111.— *P. Doncaria* BUCH.-HAM. ex WALL., Cat. n. 2147 (1828).
Distribution: Malay Peninsula!

4. **Premna parasitica** Bl., Bydr. 816 (1826); Verb. 112.— A climbing, very often epiphytic shrub; leaves very characteristic by the decurrent base, the lamina continuing below the point of starting of the lower nerves; young leaves membranous, afterwards coriaceous or coriaceo-chartaceous; petioles always short, 1.2-2.5 c.M.; corymbs 11-32$^1/_2$ c.M. long; calyx glandular; corolla-tube 0.2-0.37 c.M., lobes 0.05-0.1 c.M. See also under: . . . . . . 23 **P. oblongata.**
In Herb. Bog also from: Java!
Distribution: Java!, Sumbawa! Timor! Celebes!

5. **Premna sterculifolia** K. ET G. Kew Bull. 108 (1908); Verb. 113.
Var. α **typica** H. J. L., Verb. 114
In Herb. Bog. from:
Celebes: KOORDERS n. 19529 β (forest nr. 2038), Kaweng, 700 M. in alt., climber, 15 M. high, epiphytic; fr. blue-black on 12.III. 1895; native name: Kunet sasameren lewo.—Luzon:? ELMER n. 16711 (*P. subrotundifolia* Elm. ms (?), Irosin(Mt. Bulusan), Sargoson).
Var. β **cordata** King et Gamble, l.c.; Verb. 114.
Distribution of the species: Malay Peninsula!, ? Luzon!, ? Celebes!
It may be that the two specimens mentioned do not agree exactly with the type specimen of *P. sterculifolia*, which we have not seen. So it is perhaps separate species. Of ELMER'S *P. subrotundifolia* we have not found the description.

6. **Premna Ruttenii** H. J. L., Verb. 114.
Distribution: Borneo!

7. **Premna decurrens** H. J. L., nov. spec.- Arbor trunco 70 c.M. diametro; ramuli teretes, novelli dense lanuginosi, dein glabrescentes, apices versus repente attenuati; folia ad apices ramulorum conferta opposita vel fere opposita, membranacea, ovato- ratundata, basi longe, interdum subabrupte attenuato-decurrentia, apice breviter acuteque acuminate, marginibus integra; nervis utrinque majoribus 5-6, omnibus angulo simile e costa media nascentibus vel interdum inferioribus angulo majore, recto vel etiam obtuso e costa exorientibus, supra sparse pubescentia, subtus minute tomentella,

nervis utrinque densius vestitis; 11-30 c.M. longa, $6^{1}/_{2}$-13 c.M. lata, petiolo 0-1.2 c.M. longo; corymbi terminales, ampli, laxi, multiflori, lanuginosi, 20-33 c.M. longi, 18-27 c.M. diametro, pedunculo 6-16 c.M. longo; cymi oppositi vel alterni, di- vel trichotomi, bracteae deltoideae, 0-6 c.M. longae, 0.2 c.M. latae, acuminatae, flores apices ramulorum versus accumulati; calyx cupuliformis, bilabiatus, labiis integris vel interdum obsolete biundulatis; dense simplici-puberulus, 0.2, c.M. longus, ± sessilis; corrolla alba, tubo glabro, 0.3 c.M longo, lobis extus puberulis, inter sese ± similibus, 0.1 c.M. longis et latis; fauce densissime villosa; stamina 0.1 c.M. exserta, fauce inserta; stylus 0.15 c.M. exsertus, stigmate breviter bifida; ovarium glabrum.

Sumatra: LÖRZING n. 5854, Sibolangit, Bandarbaru; 800 M. flowering on 11. VII. 1918.

Its affinity is with *P. parasitica* (this species with leaves coriaceous, not narrowly decurrent). *P. sterculifolia* (this species with leaf-base truncate or cordate) and *P. Ruttenii* (with corolla-lobes glabrous, infl. 13×11 c.M.).

8. **Premna alba** H. J. L. Verb. 115 (1919),

Distribution: Palao-islands!

9. **Premna Peekelii** H. J. L., Verb. 115 (1919).

See also under 48. *P. acuminate* R. BR.

Distribution: New-Britain!

10. **Premna Curranii** H. J. L. Verb. 116 (1919).

in. H. bog. also from:

Celebes: ZOLLINER n. 1148, Boni; corolla albida, Nov. 1847.

Distribution: Celebes! Luzon!

11. **Premna borneensis** H. J. L. Verb. 117 (1919).

In H. bog. a specimen from HAVILAND and HOSE, n. 3394 L., Sarawak nr. Kuching.

Distribution: W.—Borneo!

12. **Premna congesta** MERR., Phil. Journ. Sci. Bot,—, Suppl., 232 (1906); Verb. 118.

Distribution: Palawan (Philippines)!

13. **Premna angustifolia** H. J. L., Verb. 118 (1919).

Distribution: New-Guinea!

14. **Premna timoriana** DECNE. Nouv. Ann. Mus. Par., III, 402 (1834); Verb. 119.—*P. tiliaefolia* ZIPP. ex SPANOGHE, Linnaea XV, 330.—*P. syringaefolia* ZIPP. l.c.—*Pygmaeopremna humilis* MERR., Phil. Journ. Sci. Bot. V, 225 (1910), e.d.—A. shrub, 2-3 M. high (BACKER); leafbase obtuse or broadly cuneate, sometimes ± rounded or truncate, abrupt or somewhat decurrent; margins entire or sometimes with some large, irregular teeth; pairs of nerves 3-5 (-7); 0.6-3-9 by 0.4-1.4-3.7 c.M.; petioles 0.1-0.5-2.8 c.M.; corymbs 0.9-2.8 c.M. long; 0.7-3.8 c.M. in diam; penduncles 0-0.6 c.M.; calyx 0.1-0.2 c,M.; fruit 0.3 c.M. in diam.

In H. bog. from:

Java: BACKER n. 18275, Puger, E. Java, 50-100 M. in alt.; flrs, greenish-white.— Madura: BACKER n. 19628, 10 M. in alt., fr. black; ID. n.

20130, 100 M. in alt., Mcktosari, flrs. white, fr. bluish-black; a shrub, 2-3 M. high.

Distribution: Timor! Java!, Madura!, Philippines! Gilberts-isl!

15. **Premna ceramensis** MIQ. Fl. Ind. Bat. II, 1893 (1856); Verb 120.

Distribution; Little-Ceram!

16. **Premna punctulata** CLARKE in HOOK. f., Fl, Br. Ind. IV, 575 (1835); Verb. 121.

Distibution: Malacca!

Perhaps this species and the preceding one are identical with *P. integrifolia*.

17. **Premna divaricata** WALL. ex SCHAU. in Dc. Prodr. XI, 631 (1847); Cat. n. 1781 (1828); Verb. 121.—*P. integrifolia* WILLD. Ges. Nat. f. Fr., Neue Schr. IV, 187 (1803).—*P. lucidula* KURZ, For. Fl. Brit. Burma II, 263 (1877).

In H. Bog. also from:

Burma!, Tavoy!, (SHAIK MOKIM n. 588, April 1901, with young fruit).

Distribution: British India! Malay Peninsula! Java!

18. **Premna perakensis** KING et GAMBLE, Kew Bull. 107 (1908); Verb. 122.

Distribution: Perak (Malay Peninsula)!

19. **Premna cauliflora** STAPF., Trans. Linn. Soc., Ser. II, IV, 215 (1894); Verb. 124. (see also annotation).

See also under *Schizopremna*.

Distribution: Borneo!

20. **Premna areolata** MERR., Phil. Journ. Sci. Bot. X, 73 (1915); Verb. 124

Distribution: Basilan (Philippines)!

21. **Premna Kunstleri** KING et GAMBLE, Kew Bull., 109 (1908); Verb. 125.—

In H. bog. from:

Borneo: JAHERI (NIEUWENHUIS) n. 1337, Sepan Bruma.

Distribution: Malay Peninsula! Sumatra! Borneo!.

22. **Premna adenosticta** SCHAUER, DC., Prodr. XI, 630 (1847); Verb. 126.

Distribution: Luzon!

23. **Premna oblongata** [1]) MIQ., Fl. Ind. bot., II, 893 (1856); Verb. 127—*Leaves* membranous, lower side sparsely brown tomentose with simple hairs; $8^{1}/_{2}$—16 by 5—6 c.M.

Distribution: Java!, ? Luzon!

The following table may indicate the most important differences between P. OBLONGATA, OBLONGIFOLIA, PARASITICA and TRICHOSTOMA, 4 very related species:

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[1]) The varieties *α puberula* and *β subglabra* could not be retained, since we found that the β-variety belongs to *P. oblongifolia* MERR. *var. β*.

<table>
<tr><th>P. OBLONGATA MIQ.</th><th colspan="2">P. OBLONGIFOLIA MERR.</th><th>P. PARASITICA. BL.</th><th>P. TRICHOSTOMA MIQ.</th></tr>
<tr><td rowspan="3">LEAVES oblong or obovate, base rounded; both sides ± pubescent; membranous; pet. $1^{1}/_{2}$-$3^{1}/_{2}$ c.M.; leaf 8-16 by 5-6 c.M. CALYX 4-ribbed, with 4 large, obtuse teeth, 0.1-0.15 c.M. COROLLA-tube 0.1-0.15 c.M.</td><td>var α</td><td>var β</td><td rowspan="3">LEAVES coriaceous base decurrent, continued below the starting point of the lowest nerves; both sides ± pubescent: 10-30 by 5-20 c.M.; pet. 1-$2^{1}/_{2}$ cM.; INFL. 11-32 by 5-27 c.M. CALYX-lips entire, cal. 0-2 c.M. COROLLA-tube 0.2-0.37 c.M.</td><td rowspan="3">LEAVES chartaceous, base rounded, nerves pubescent; 10-18 by 5-12 c.M.; pet. $1^{1}/_{2}$-$2^{1}/_{2}$ c.M.; INFL. 10 by 9-12 c.M.; CALYX with 4 small teeth, 0,1-0.15 c.M.; COROLLA- tube 0,25 c.M.</td></tr>
<tr><td>LEAVES 5-10 by 2-5 c.M., entirely glabrous pet. 1-1.7 c.M.</td><td>LEAVES 11-16 by 3-9 c.M., glabrous or pubescent on nerves; pet, 2-2.6 c.M.</td></tr>
<tr><td colspan="2">coriaceous or chartaceous; reticulation very distinct; leaf-base rounded; <i>Infl.</i> 7-10 by 6-12 c.M.; CALYX as in P. oblongata, 0.15-0.2 c.M.; corolla-tube 0.15-0.2 c.M.</td></tr>
</table>

24. **Premna trichostoma** 1) MIQ. Fl. Ind. Bot. II, 892 (1856); Verb. 128.—*P, parasatica* CLARKE in HOOK f. Fl. Br. Ind. IX, 574 (1885), not of BLUME.—Some specimens seem to form a transition to *P. parasitica* See also under 23. P. *oblongata.*

In. Herb. Bog. also from:

Java: KOORDERS n. 34103 β, Pringombo, 800 M. in alt., scandent, flowers white, on 25.8.1900.

Distrbution: Java! Malay Peninsula! Borneo!

25. **Premna Williamsii** MERR, Phil. Journ. Sci., Bot. X, 74 (1905); Verb. 129.

Distribution: Mindanao!

26. **Premna oblongifolia** MERR. Phil. Gov. Lab. Bur. Bull. XXIX, 118 (1905); Verb. 129.—Leaves always coriaceous, distinctly reticulate, entirely glabrous or with some hairs on the nerves beneath; characteristic is the oblong-obovate leaf (P. *oblongata* also has leaves of this form, but they are always membranous and ± pubescent on both surfaces); *leaves* opposite, sometimes ternate (in Hort. Bog. sub singo XV. F. 1); pairs of nerves 4-6; $5^{1}/_{2}$-15.8 by $2^{1}/_{2}$-8.6 c.M.; petioles 1-2.6 c.M; corymbs not larger than 7-10 c.M.; in length, 5-8 c.M. in diam. — See also under 23. P. *oblongata.*

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1) MR. BACKER draws our attention to a Greek rule, according to which the th. in the beginning changes into t when it occurs in a composed word and a following letter turns into a double one (so we write thrix but trichostoma).

Distribution: Luzon! Borneo!, Java!, Sumatra!

Var. β **typica** H. J. L., nov. var.—Folia minora, utrinque glaberrima, $5^1/_2$ - 10 c.M. longa, 2 - 5 (-$7^1/_2$) c.M. lata; petiolo 1 - 1.7 c.M. longo; nervis utrinque circiter 4.

Borneo: v. Heutsz n. 847;—Luzon: ELMER n. 5990, Baguio, Benguet, flowering in March 1904.

Var. β **major** H. J. L., nov. var.— *P. oblongata* MIQ. *Var.* β *Subglabra* H. J. L., Verb. 127—Folia majora, glabra vel in aut prope nervis, praesertim subtus, puberula; 11 - 15.8 c.M. longa, $3^1/_2$ - 8.6 c.M. lata; petiolo 2.1 - 2.6 c.M. longo; nervis utrinque circiter 6.

Borneo: TEYSMANN, Sungei Landak.— Java: BACKER n. 17188, Tjitjurug, 250 M. in alt., a tree, 8 M. high, fruiting on 17. XI. 1918; ID. n. 736, Tjisalak, 50 M. in alt., fr. on 24. XII. 1911-; ID. n. 18509, Madjenang, 50 M. in alt.—LÖRZING n. 722, Tjandirátá; 750 M. in alt., fr. on 14. XII. 1912; native name: Tjéléngan or Godeng tjéléngan (j.); a crooked shrub, the short stem tree-like, $3^1/_2$ M. high; lower side of leaves with some stinging hairs, which produce a sensation similar to that of Laportea-species; ID n. 680, Tandjongsari, Tjandiràtà, 500 M. in alt., flow. on 12. XI. 1912; native name: Dèng or Tjéléngan (j.); many-branched shrub, probably somewhat scandent.—TEYSMANN, Teman-gung; native name Tjiklingan. — Sumatra: LÖRZING n. 4363, Bandarbaru, 800 M. in alt., buds on 27. VI 1916; epiphytic shrub, on high, stout tree-trunk, branches 2 M. long.

27. **Premna Ridleyi** KING et GAMBLE, Kew Bull., 109 (1908); Verb. 130.

Distribution: Malay Peninsula!

28. **Premna rufidula** MIQ. Fl. Ind. Bot. Suppl., 243 and 569 (1862); Verb. 131.

Distribution: S.- Sumatra!

29. **Premna regularis** H. J. L. Verb. 131. (1919).

Distributton: New.-Guinea!

30. **Premna membranacea** MERR., Phil. Gov. Lab. Bur. Bull., XXXV, 65 (1906); Verb. 132.

Distribution: Philippines!

31. **Premna rotundifolia** KOORD. et VAL., Bydr. Booms. Java, n. 7, 182 (1910); Verb. 132.—

In. H. bog from:

Java: MOUSSET n. 942, Mt. Tengger, 900 M. in alt.; epiphytic (!).

Distribution: Java!, Sumatra?

32. **Premna sessilifolia** H. J. L. Verb. 133 (1919) — A small shrub, young parts glabrous or strigosely pubescent; leaves membranous or chartaceous, margins irregularly sinuate or serrate; 4 - 15 by 1.8 - 7.7 c.M.; corymbs terminal or pseudo-axillary (one of the axillary shoots being strongly developped); 2 - 4 c.M. long, $1^1/_2$ - 3 c.M. in diam; *penduncles* 0.7 - 1.6 c.M.

In Herb. Bog. also from:

Celebes: NOERKAS (v. VUUREN) n. 245, Cape Lapacansal, fr. on 20. V. 1912; native name: Paké-paké (this specimen seems to be a small shrub, reaching 10 c.M. in height only [1]), H. J. L.); ID. n. 284, Cape Alakuan, with flow. and fr. on 6. VI. 1912.

Distribution: New Guinea! Celebes!

33. **Premna angustiflora** H. J. L., Verb. 134. (1919).

Distribution: Palao-isl!

34. **Premna littoralis** KING et GAMBLE, Kew Bull., 107 (1908); Verb 135.

Distribution: Perak (Malay Peninsula)!

35. **Premna benguetensis** C. B. ROB., Phil. Journ. Sci. Bot., III, 215 (1908); Verb. 136.

Distribution: Luzon!

36. **Premna flavescens** HAM. ex WALL. ex CLARKE in HOOK. f., Fl. Br. Ind. IV, 578 (1885); Cat. n. 2649 (1828); Verb. 136.

Var. α **typica** H. J. L., Verb 137.—E. - Bengal!

Var β **glabrior** CLARKE in HOOK. F., Fl. Br. Ind. IV. 578.—Sikkim! Silhet!

Var. γ **rubens** CLARKE, l. c.; Verb. 137—*P. lucidula* MIQ. Fl. Ind. Bat. I, 898 (1856).- Leafbase always cuneate; margins entire or somewhat irregulary dentate—Burma! Malacca! Sumatra! Java!

In Herb. Bog. also from: CHRISTMAS - ISL. (ANDREWS n. 103).

Distribution of the species: Brit. India! Malacca! Sumatra! Java! Christmas isl.!

37. **Premna membranifolia** MERR., Phil. Journ. Sci. Bot. VIII, 388 (1913); Verb. 137.

Distribution; Leyte (Philippines).

38. **Premna parviflora** H. J. L., nov. spec.— Frutex?; ramuli teretes, glabri, lenticellis distinctis; folia ovato-oblonga, basi leviter cordata, apice acuminata, marginibus integris, supra glabra, costa media puberula, subtus glabra, prope costam mediam puberula, nervorum axillis barbellata; nervis utrinque 6-8; 10-17 c.M. longa, 5½-9 c.M. lata, in eodem pari saepe inaequalia; petiolo glabro, sulco superiore excepto, 2-6 c.M. longo; corymbi terminales, strigose fulvo-ferrugineo-puberuli, usque ad 12 c.M. longi, 6 c.M. lati, pedunculo 4 c.M. longo; bracteae inferiores foliaceae, ovato-acuminatae, 1.2 c.M. longae; 0.5 c.M. latae, apicem corymbi versus diminutae, lineares, 0.2 c.M. longae; pedicelli ± 0; calyx cupuliformis, bilabiatus, labio superiore. 3, inferiore 2 dentibus subobtusis; 0.125-0.15 c.M. longus, glaber vel subglaber; corolla parva, 0.3 c.M. longa, glabra; tubo 0.1-0.12 c.M. longo, calyce breviore vel interdum aequante; fauce dense villosa; lobis obtusis, uno majore; stamina 0.125 c.M., fauce inserta; stylus 0.2 c.M., stigmate brevissime bifido; ovarium glabrum.

Celebes: RACHMAT (V. VUUREN) n. 167, Tjempaga, flow, on 18. VII. 1913.

39. **Premna nervosa** KDS et VAL. Bijdr. Booms. Java n. 7, 186 (1910); Verb. 138.—

In Herb. Bog. also from:

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[1] Young plant?

Java: BACKER n. 22005, Babakan, Tjikeas, 160 M. in alt., fruits shining, dark-violet, ± 0.8 c.M. in diam.; more or less 5-ribbed; with irregularly wrinkled endocarpium; fr. in Jan. 1917.—KOORDERS n. 22039 β, Nusa kambangan.

Distribution: Java!

40. **Premna paulobarbata** H. J. L., Verb. 139. (1919).

Distribution: Marianne-isl!

41. **Premna Wrayi** KING et GAMBLE, Kew Bull. 109 (1908); Verb. 139.

Distribution: Perak (Malay Peninsula)!

42. **Premna integrifolia** L. Mant. II, 252 (1771), s.a.; Verb. 140; MERRILL. Interpretation Rumph. Herb. Amb. 450 (1917).—*P. abbreviata* MIQ., Fl. Ind. Bat. II. 892 (1856).—*P. cordifolia* WIGHT, Ic. t. 1483 (1850).—*P. corymbosa* ROTTLL. et WILLD., Ges Nat. f. Freunde, Neue Schr. IV, 87 (1803). *P. cyclophylla* MIQ., l.c. 899—*P *densiflora* WALL. Cat. n. 1773 (1828)—*P. foetida* RW. ex Bl. Bydr. 816 (1826)— *P. gaudichaudii* SCHAU., D.C. Prodr. XI, 631 (1847)—*P. laevigata* MIQ., l.c. 895 and suppl. 243—*P. media* R.BR., Prodr. 512 (1827)-- *P. nitida* K. SCHUM. in SCHUM. u. HOLLR., Fl.Kais.-Wilh. land, 120 (1889)—*P. *obtusifolia* R.BR., l.c. 512. *P. opulifolia* MIQ., l.c. 898—*P. ovalifolia* WALL., Cat. n. 1782 (1828)—*P. ovata* R.BR., l.c. 512—*P. sambucina* WALL., l.c.n. 1775— *P. scandens* BOJ., Hort. Maurit., 257 (1837)—*P. serratifolia* BLCO., Fl. Fil. ed. II, 342 (1845)—*P. serratifolia* L., Mant. 253 (1771)—*P. *spinosa* ROXB., Fl. ind. III, 77 (1832)—*P. subcordata* TURCZ., Bull. Soc. Nat. Mosc. XXXVI, II, 216 (1863)— *P. *subglabra* MERR., Phil. Journ. Sci. Bot., I, Suppl. 234, (1906)—*?*P. taitensis* SCHAU., D.C. Prodr. XI, 638 (1847)— *P. *truncata* TURCZ., Bull. Soc. Nat Mosc. XXXVI, II, 215 (1863)— A shrub, 1—7 M. high, sometimes climbing, sometimes treelike, very polymorphous; sometimes fragrant, which feature is not constant in the „foetida" type, and occurs also in the others types; tomentum of the young parts very variable, usually (in sicco) rather dense, yellowish; flowers greenish white, (or dark-yollow?, Kds. n. 24073 β, Celebes); fruit green at first, afterwards red, ultimately black,

In Herb. Bog. also from:

Java!, Celebes!, Madura!, Luzon!, Seribu!, Obi!, Simalur!, Buru!, Ambon!, Mindanao!, Saleyer!, Samoa? (P. taitensis).

Native name: Singkiel (Nusa kambangan); Kigeseng (Java.); Arelau (Sumatra); Kayu seungit or K. sungit (Celebes tw.).

Distribution: Madagascar! Mauritius! British India from Bombay to Malacca! Siam! Ceylon! Andamans! Nicobars! Hongkong! Malay archipelago! Philippines!; Polynesia!

Above we repeated the youngest synonymes, 7 of them (those with en asterisk) being added to those, enumerated in our dissertation. After we had studied the materials of this species present in the Herbarium bogoriense, we decided it would be more exact, to omitt our two subspecies, TRUNCATOLABIUM and DENTATOLABIUM, and to replace them by some more or less distinct types; these, however, can not be separated distinctly, but only indicate the average tijpe of a certain group of plants, which gradates into an other tijpe. Such types might be:

I. type INTEGRIFOLIA; Verb., Pl. II, H, I, Q (P. INTEGRIFOLIA, CORYMBOSA, OBTUSIFOLIA, OVALIFOLIA)- Leaves ovate, small, entire, base rounded or slightly cordate, apex rounded or indistinctly acuminate.

II. type ABBREVIATA; Verb, Pl. II, M (P. ABBREVIATA, SERRATIFOLIA L.)- Leaves as in I but margins crenate towards the apex. As I this type often occurs near the sea-shore as a small shrub.

III. type CYCLOPHYLLA; Verb., Pl. II, K, and, as transition-forms to types IV en V also D and O (P. CYCLOPHYLLA)- Leaves rotundate, base somewhat cordate, apex with a small rounded, sudden acumen.

IV. type SAMBUCINA; Verb., Pl. II, A, C, E, O (P. SAMBUCINA, ? TAITENSIS, SUBGLABRA)- Leaves ovate-rotundate, entire or slightly crenate towards the apex, base rounded or somewhat cordate, apex shortly acuminate.

V. type FOETIDA; Verb., Pl. II, B, F, G, H, L, N, P, Q, R, S (P. FOETIDA, GAUDICHAUDII, LAEVIGATA, NITIDA, SUBCORDATA)- Leaves ovate or ovate-rotundate, entire, or somewhat crenate, base rounded or cuneate, apex rather long acuminate.

There seems to be, generally speaking, a rether parallel alteration of several features, going from I to V [1]):

a. the general habit becomes larger, from a small shrub, $^1/_2$ M., to a treelike shrub 7 M.

b. the habitat removes from the sea-shore to the inland.

c. the leaves become larger and more acuminate.

d. the calyces become more distinctly and acutely toothed.

Type IV forms a transition from the small- and round- leafed forms. (Type I-III) to those with larger, more acuminate leaves (Type V).

43. **Premna macrophylla** H. J. L., Verb. 148. (1919).

Distribution: Sumatra! Java! Borneo!

44. **Premna depauperata** MERR. Phil. Journ. Sci. Bot. I, Suppl. 231 (1906); Verb. 149.

In Herb. Bog. also from:

? Celebes: RIEDEL, Gorontalo.

Distribution: Pilippines!, ? Celebes! Tukan-Besi- and Kabaena-isl!

45. **Premna leucostoma** MIQ Fl. Ind. Bat. II, 899 (1856); Verb. 149.— Leaves $^1{}_2$-8$^1/_2$ by 1.25-6 c.M.; petioles 0.3-1.4 c.M.; base sometimes decurrent; leaves in sicco brownish yellow, not black (point of difference from P. *latifolia*).

In Herb. Bog. also from:

Java: BACKER n. 13043. Kraksaän! flrs. white.

Native name: Waung (j.).

Distribution: Java!

In Herb. Kds. occurs a from, which has leaves 14$^1/_2$ by 7$^1/_2$ c.M. petioles 3.2 c.M., the corymbs reaching 14 by 8 c.M., peduncles 4 c.M.; we hesitate, whether this form belongs to this species or to the following one, but since its leaves are blackish in sicco we placed it, with doubt, under *P. latifolia* (see there.). Perhaps the two species are identical.

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[1]) Thus it may be possible that the polymorphy in due as well to physiological influences (habitat- modifications), as to variability and hereditary factors.

46 **Premna latifolia** ROXB. F. ind. III, 76 (1832); Verb. 150.

Var. *a.* **typica** H. J. L., Verb. 151; Coromandel coast! Bengal!

Var. *b.* **cuneata** C. B. CLARKE in HOOK. f., Fl. Br. Ind. IV, 577; Verb. 151; Pegu! Burma!

Var. *c.* **mollissima** C. B. CLARKE, l.c.; Verb. 151; Madras!

Var. *d.* **mucronata** C. B. CLARKE, l.c.; Verb. 151.—*P. nauseosa* BLCO; Fl. Fil. ed. I, 849 (1837); Verb. 159.—*P, mucronata* ROXB. Fl. Ind III, 80 (1832).— *P. mucronata* F. VILL. Nov. app. 159 (1877).—*P. leucostoma* NAVES ex. F. VILL. in Nov. app. 159 (1877).—*P. integrifolia* BLCO., Fl. Fil. ed. II (1845).—Leaves reaching 15 c.M. in length, usually less.—, N. India! Bengal!? Java! Philippines!

In Herb. Bog. also from:

Java: BEUMÉE, Semarang! fr. in Jan. 1917; fruit violet; many-branched tree, 10 M. high—KOORDERS, Semarang, ns. 9855 β, 9856 β, 9858 β, 9859 β, 9860 β, 13741 β, 25257 β, 42740 β, all of them in woods of Tectona grandis (leaves 14½ by 7½ c.M., glabrous below or somewhat pubescent on or near the nerves, petioles 3.2 c.M.; corymbs reaching 14 c.M. in length, 8 c.M. in diam., peduncles 4 c.M.; see also under preceding species).— Luzon: MERRILL, Pl, Blanc. n. 299, with flrs. and young fruits in Sept. 1913—ELMER n. 8071, flow. in Apr. 1900; ID. n. 18101, flow. in June—July 1917.— MERRITT and DARLING n. 14077.— BORDEN n. 769, flow. in May 1904 and n. 1271, fruiting in July 1904.— AMARILLAS n. 25028, flow. in Febr. 1916- RAMOS n. 1894, fcow. in Aug. 1914—WHITFORD n. 337, with flowers and young fruits in June 1904. (all of them the former *P. nauseosa*).

Var. *e.* **viburnoides** C. B. CLARKE, l. c.; Verb. 151; S.-Deccan Peninsula!

Distribution of the species: Brit. India!, Java!, Philippines!

47. **Premna pubescens** BL. Bijdr. 816 (1826); Verb. 152.

Var. *α* **subglabra** H. J. L., Verb. 153.— P. *pubescens* BL. l. c. s. s.- leaves sometimes entirely glabrous (ZOLL. 3813); calyx sometimes glabrate; drupe 1 c.M. in diam.

In Herb. Bog. also from:

Java: HALLIER, Depok, climbing; EDELING, Batavia; BACKER, Kebajoran; DOCTERS VAN LEEUWEN-REIJNVAAN n. 800; Mt. Muriah, flrs. white, shrub, 2 M. high; KOORDERS ns. 31232 β and 31281 β, Depok, flrs. pale green, shrub, 4-8 M. high.

Distribution of the variety: Java!, Sumatra!, Timor!, Sumbawa!

Var. β **odorata** H, J. L., Verb. 153.— P. *odorata* BLCO., Fl. Fil. ed. I, 489 (1837).— P. *foetida* F.-VILL., Nov. App. 159 (1877).— P. *serratifolia* BLCO. l. c. ed. II, 269 (1845).— P. *subscandens* MERR., Phil. Journ. Sci. Bot. I, Suppl. 230 (1906).— P. *vestita* SCHAU., DC. XI, 631 (1847).— P. *tomentosa* F.- VILL. l. c.

In Herb. Bog. also from:

Philippines—Java: BACKER n. 16992, Bodjong Lopang to Lengkong, 700 M. in alt.; native name: Areng; a shrub, 3 M. high, flow. on 12. XI. 1914; ID. n. 17281, Tjitjurug, 325 M. in alt., flow. on 18. XI. 1914; ID. n. 17499, TJitespong, 5 M. in alt., fr. on 25. XI. 1914.— Celebes: TEYSMANN n. 14141, Bonthain.

Distribution of the variety: Java! Kabaena! Tukang-besi! Philippines! Celebes!

Distribution of the species: Burma! Malacca! Andamans! western and central parts of Malay Archipelago! Philippines!

48 **Premna acuminata** R.BR., Prodr. 512 (1827); Bth. and Muell., Fl. Austr., V, 60—A small tree; branchlets round, minutely striate, minutely tomentose when young; leaves opposite, rather variable in form; from nearly deltoid, the base broad, the margin perpendicular to the petiole or somewhat decurrent into it, the apex attenuating from near the base, long, obtuse; to broadly subcordate-ovate or rotundate, apex hardly acuminate, obtuse; the first type, however, being the the characteristic one; 9-14 by 3.3-9$^1/_2$ c.M.; petioles 2$^1/_2$-7 c.M.; lamina membrano-chartaceous, on both sides minutely puberulous, as in the above sulcate petiole; nerves very faint, densier pubescent, in about 7 pairs; margings entire; corymbs terminal, very lax, ample, few-flowered, minutely puberulous, 8-17 M. long, 13-19 c.M. in diam., peduncles 0—4 c.M.; cymes opposite, the lowest on long peduncles; op to 6 times dichotomously branched; lowest bracts sometimes leafy, 3$^1/_2$ by 0.5 c.M., upper ones lanceolate to linear, gradually diminishing to 0.5 c.M. in length; calyx cupuliform, somewhat 2-lipped, with 5 acute teeth, 0.2 cM. long and in diam.; strigosely greyish pubescent in the inferior, glabrous in the upper part, as are teeth; pedicels 0-0.1 c.M.; corolla 0.45 c.M., glabrous without; 0.3 c.M. in diam., tube 0.35 c.M.; densely villous int hroat; lobes rounded, small; stamens inserted in the upper part of the tube, hardly exsert; style with shortly bifid stigma, a little exsert; ovary cubic, glabrous: fruit 0.5 c.M. long, 0.35 c.M. in diam.

Thursday-isl. (between the mainland of Australia and New-Guinea): JAHERI, without nr., flow. on 6. V. 1901.

This plant ie very nearly related to our *P. Peekelii* (Verb. 115), from New-Britain, and this is the reason, why we make mention of it; for we are not quite sure, whether the present species is a variety of it, or not. And we should not be surprised to find that it also occurs in New-Guinea, this country being situated between N. Australia and the Bismarck-archipelago. Indeed, Thursday-isl. is very near to the mainland of New- Guinea.

49. **Premna Goeringii** TURCZ., Bull. Soc. Nat. Mosc., XXXVI, II, 216 (1863); Verb. 154.

Distribution: Java?

50. **Prëmna stellata** MERR., Phil. Journ. Sci. Bot. XI, 203 (1916); Verb. 154.

Distribution; Samar (Philippines)!

51. **Premna tomentosa** WILLD., Spec. III, 314 (1800); Verb. 156.— *P. flavida* MIQ., Fl. Ind. bat. suppl. I, 570 and 243 (1860); Verb. 147.— *P. pyramidata* WALL., cat. n. 1779 (1827); Verb. 155.— A tree reaching

19 M. in height; *leaves* opposite, sometimes ternate, 10-35 c.M. long $7^1/_2$-22 c.M. broad; young leaves often ± coarsely serrate; lower side flloccose to subglabrate; petioles 3-12 c.M.; inflorescences 9-38 c.M. ong, 4-22 c.M. in diam., peduncles 3-11 c.M.; flowers whitish; fruits, dirty violet-black.

In Herb. Bog. also from: Java!, Timor!, and Sumatra: DIEPENHORST no. 2107 and 2325, Priaman, and n. 2907, Pisang-Pisang— GRASHOFF n. 1093, Palembang, Rawas, 150 M. in alt.; native name: Leban tjapo; a tree, 15-18 M. high, trunk always crooked, with many young shoots at the base, reaching 50 c.M. in diam., crown low, large, many-branched; bark light-brown; flrs. greenish white (all of them the former *P. flavida*); — Philippines: AHERN'S coll. n. 1805, S. Mateo, Rizal, Luzon, flow. in Sept. 1904;—Malay Peninsula: RIDLEY n. 14261; Perak, fruiting in July 1909.— n. 1645 without collector, Negri Sembilan, fr. on 4. VIII. 1916.

Native names: Gembolang (j.), Bolang or Bungbulang or Bunglang (j.), Gadungang (east- j.), Bigbul (s.), Kayu bebulan handak (Lampongs), Leban tjape (Lamp.)

Distribution: British India! (Burma! Ceylon! Deccan! and Malay Peninsula!), Sumatra!, Java!, Timor!, Luzon!

52. **Premna Cumingiana** SCHAU. DC. Prodr. XI, 634 (1847); Verb. 157.—*P. cardiophylla* SCHAU. l. c. 638.—*P. cordata* BLCO. Fl. Fil. ed. I, 489 (1837).—*P. tomentosa* BLCO. l. c. ed. II, 342 (1845).— *Leaves* $10^1/_2$-42 by 8-25 c.M.

In Herb. Bog. also from:

Philippines! and from Celebes: KOORDERS n. 19530 β, Minahassa.

Distribution: Philippines! Celebes!

Doubtful species:

53. **Premna Ledermanni** H. J. L., Verb. 159 (1919).

Distribution: N-E-New-Guinea.

54. **Premna papuana** WERNH., Trans. Linn. Soc. IX. I. 136 (1916); Verb. 160

Distribution: Dutch. New-Guinea.

55. **Premna populifolia** MIQ.; Verb. 160.—The specimens in the Herb. Bog., probably belonging to this species, show the following particuliarities: Leaves chartaceous, margins entire or somewhat serrate, reaching $14^1/_2$ by 8.2 c.M., petioles reaching 6 c.M.; corymbs terminal, 6-12 c.M. long, $5-9^1/_2$ c.M. in diam., peduncles $1-3^1/_2$ c.M; calyx glabrous or nearly so, 0.15 c.M., cupuliform, 2-lipped, upper lip entire or somewhat 3-undulate, lower one with 2 rather large, obtuse teeth; corolla 0.4 c.M., glabrous, tube 0.3 c.M., lobes rounded, subequal; limb obliqua; throat very densely villous; stamens shortly, style (with shortly bifid stigma) somewhat longer exsert; ovary glabrous; fruit globose, 0.3-0.4 c.M. in diam.

Sumatra: DIEPENHORST n. 2124, Priaman - n. 18329, Pandang Karimon, without collector (Teysmann?!) — Borneo: TEYSMANN n. 8343, Pontianak. — Mal Arch: n. 18514, without collector Teysmann?! and locality. We are in doubt, whether this species is of synonymous with *P. integrifolia* or not.

Distribution: Sumatra! Borneo!

PYGMAEOPREMNA MERR. (Auctore H. J. L.).

Phil. Journ. Sci. Bot. V, 225 (1910); Verb. 160.

MERRILL'S **Pygmaeopremna humilis**, in our opinion, belongs to *Premna timoriana*; this needs not to be surprising, since there are several species common both to Timor and the Philippines.

13. **VITICIPREMNA** H.J.L. (Auctore H.J.L.)

Verb. 162. (1919).

The feature of the barbate hairs in the corolla-throat before the upper lip is only valid in the case of V. novae-pommeraniae.

Viticipremna Turczaninowii (now *P. philippinensis*), also in the specimens of the Herb. bog., show always the leaves of a Vitex and the flowers of a Premna. So we think the genus really is a good one.

Distribution: Philppines! New-Guinea! New-Britain! New-Ireland!

a. Leaflets with acute base; tomentum ferruginous
1. **V. philippinensis.**

b. Leaflets with obtuse or rounded base; tomentum greyish-yellow.
2. **V. novae-pommeraniae.**

1. **Viticipremna Philippinensis** [1]) (TURCZ.) H.J.L., Nov. comb.— *V. Turczaninowii* (MERR.) H.J.L., Verb. 162 (1919)— *Vitex Turczaninowii* MERR., Phil. Gov. Lab. Bur Bull. XXXV, 77 (1905)— *Premna philippinensis* TURCZ., Bull. Soc. Nat. Mosc. XXXVI, II, 215 (1863)— Leaves 3—5—foliate; calyx 0.2—0.3 c.M.; corolla always as in Premna, 4—lobed, one lobe larger, rounded, 0.2—0.4 c.M., the other 3 obtusely deltoid, 0.15—0.2 c.M.; tube 0.5 c.M; stamens didynamous, 0.5—0.6 and 0.6—0.75 c.M.

In Herb. Bog. also from:

Mindanao: M.S. CLEMENS, without nr., Camp Keithley, Lake Lamao, flow. in July 1907; ID?, buds in June 1907.—Luzon: RAMOS n. 1410, Rizal, buds in Aug. 1906 (leaves 5—fol.)— AHERN'S coll. n. 2961, Rizal, flow. in Apr. 1905 (leaves 3—fol.)— ? MERRITT and DARLING n. 14049, Ilocos, fruits in Nov. 1908—?? BORDÈN n. 3059 (an var.?: leaves with simple hairs beneath.)— ELMER n. 16693, flow. in July 1916.

Distribution: Philipines.

2. **Viticipremna novae-pommeraniae** (WARB.) H. J. L., Verb. 163 (1919).— *Vitex novae-pommeraniae* WARB., Engl. Jhrb. XIII, 428 (1891). Distribution: New-Guinea! New-Britain! New-Zealand!

14. **VITEX** Tourn. ex L. (Auctore H. J. L.)

Syst. veg. ed. I (1735); Verb. 164.

Distribution: in the tropics of both the old and the New World, some species in the subtropics of Europe and Asia.

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[1]) According to the rules of the botanical congress, the name for this species should be *V. philippinensis*, „philippinensis" being the oldest specific name."

1. a. Calyx regularly 5-toothed, sometimes subtruncate or truncate (Section I Agnus-castus (ENDL.) BRIQ.=Euagnus SCHAU.) . . . 3

b. Calyx 2-lipped, 1 lip entire or with 2 small teeth, the other 2-toothed, 1 lip entire or with small teeth, the other 2-toothed (Section II Glossocalyx CLARKE). 2

2. a. 1 Peduxcle p. axil . . . 39. **V. gamosepala**

b. 2 Peduncles p. axil . . . 40. **V. neglecta**

3. a. Cymes in large terminal panicles (sect. I, subsection 1 Terminales BRIQ.) . 4

b. Cymes axillary, also in the axils of the lower leaves, sometimes composed to a long, interrupted, leafed, terminal panicle (Sect. I, subsertion 2 Axillares BRIQ.) . . . 38

4. a. Petioles winged . . . 5

b. Petioles not winged. . . . 6

5. a. Petioles 3.8-6.2 c.M. long, winged towards the spex; wings rotundate, together 0.8-1 c.M. broad; leaves somewhat pubescent beneath . 1. **V. altissima**

b. Petioles 7-15 c.M. long, winged towards the base, sometimes also towards the apex, with the wings 0.4-1.5 c.M. broad; leaves pubescent beneath 2. **V. alata**

6. a. Leaves 1-, sometimes 2-foliolate . . . 7

b. Leaves 3-5 (-7-9) foliolate . . . 12

7. a. Leaflets 8-30 c.M. long . . . 8

b. Leaflets 1.7-6.5 c,M. long, ovate or obovate, greyish tomentose beneath . . . 9. **V. trifolia var. β**

8 a. Calyx truncate or indistinctly 2-5-toothed . . . 3. **V. cofassus**

b. Calyx distinctly 5-toothed . . . 9

9. a. Leaflets 3-4-nerved; 12-20 by 4-8 c.M.; petioles 1-2 c.M.; calyx sparsely glandular without and within. . . . 4. **V. smilacifolia**

b. Leaflets 6-20-nerved . . . 10

10. a. Leaves minutely white-tomentose beneath . . . 5. **V. erioclona**

b. Leaves entirely glabrous beneath . . . 11

11. a. Leaflets 6-10-nerved . . . 6. **V. sarawakana**

b. Leaflets 10-20-nerved . . . 7. **V. Hollrungii**

12. a. Leaflets distinctly pubescent on one or both sides . . . 13

b. Leaflets glabrous on both sides, or pubescent only on the midrib . . 20

13. a. Terminal leaflet sessile . . . 14

b. Terminal leaflet petioluled . . . 16

14. a. Leaflets 3-5 (sometimes 7 or 9) lanceolate, panicles interrupted, with subsessile, opposite, globose cymes, midlobe of lower lip of corolla little longer than the lateral lobes . . . 8. **V. Agnus-castus**

b. Leaflets 1-3, or if 5, then length only twice the breadth . . . 15

15. a. Leaflets 1-3, terminal one 2.6-9.2 by 1-3.7 c.M., petioles 0.7-3 c.M., calyx 5-denticulate, 0.3-0.4 c.M., teeth 0.05 c.M. . . 9. **V. trifolia var. A.**

b. Leaflets 5, terminal one 8-15 by 3½-8½ c.M. petioles 4-8 c.M., calyx 5-toothed, 0.6 c.M., teeth 0.2 c.M. . . . 10. **V. pubescens**

16. a. Calyx 0.2-0.3 c.M., corolla (together with midlobe of lower lip) 0.7-1.1 c.M. 17

b. Calyx 0.6 c.M., corolla (together with midlobe of lowes lip) 2 c.M. . . . 10. **V. pubescens**

17. a. Corolla entirely glabrous within . . . 18

b. Corolla more or less villous in the throat and near the insertion of the stamens . . . 19

18. a. Leaflets membronous, scabrid-punctate above, densely velutinous beneath; terminal ones 10-22 by 4½-10 c.M.; petiolules 1-2 c.M. . 11. **V. velutina**

b. Leaflets chartaceous, glabrous above or nearly so, with small white scales, sparsely pubescent and glandular beneath; terminal one 9-14 by 4-7 c.M.; petiolules 1½-2½ c.M. . . . 12. **V. sumatrana**

19. a. Leaflets not or little pubescent beneath, glandular, nerves pubescent; calyx truncate or obscurely 5-toothed . . . 13. **V. heterophylla** var β
b. Leaflets whitish tomentose beneath; calyx with 5 distinct teeth, ± 5-ribbed . . . 14. **V. negundo**
20. a. Leaves 3-foliolate . . . 21
b. Leaves 5-foliolate . . . 33
21. a. Calyx truncate or obscurely toothed . . . 22
b. Calyx distinctly 5-toothed . . . 24
22. a. Leaflets white-verrucose above, glandular beneath . . . 15. **V. celebica**
b. Leaflets not white-verrucose above, not glandular beneath . . . 23
23. a. Upper lip and lateral lobes of lower lip of corolla tawny pubescent within; inflorescence leafed below, 3 flowers together; leaves sometimes 5-foliolate . . . 16. **V. nitida**
b. Upper lip and lateral lobes of lower lip of corolla glabrous within . . . 17. **V. parviflora**
24. a. Base of leaflets rounded, 6-$12^{1}/_{2}$ by 1.8-4.3 c.M., petiolules 1-$1^{1}/_{2}$ c.M.; 12-24-nerved, coriaceous . . . 18. **V. siamica**
b. Base of leaflets acute . . . 25
25. a. Proportion of length and breadth of terminal leaflet 1-2 . . . 26
b. Proportion of length and breadth of terminal leaflet 3-5 . . . 29
26. a. Inflorescence with 2 peduncles from each node . . . 27
b. Inflorescence with 4-6 peduncles from each node . . . 19. **V. flabelliflora**
27. a. Calyx and corolla pubescent . . . 28
b. Calyx and corolla glabrous . . . 20. **V. secundiflora**
28. a. Leaflets extraordinarily densely glandular beneath, 3 or 5, pairs of nerves 3-11; bracts minute . . . 21. **V. luteoglandulosa**
b. Leaflets rather sparsely glandular beneath, 3, pairs of nerves 6-8; bracts lanceolate, obtuse, 0.8-3.2 c.M. long, 0.1-0.35 c.M. broad 22. **V. glandulosa**
29. a. Calyx-lobes 0.1 c.M.; filaments stout, glandular and villous; leaflets coriaceous . . . 23. **V. coriacea**
b. Calyx-lobes 0.05 c.M. or less. . . . 30
30. a. Leaflets subsessile; calyx and corolla glabrous . . . 20. **V. secundiflora**
b. Petiolule of terminal leaflet $^{1}/_{2}$-$2^{1}/_{2}$ c.M.; calyx and corolla pubescent . . . 31
31. a. Terminal leaflet 7-$17^{1}/_{2}$ by 2.8-7 c.M., petiolule $^{1}/_{2}$-1.7 c.M.; calyx truncate or obscurely denticulate . . . 17. **V. parviflora**
b. Terminal leaflet $15^{1}/_{2}$-25 by 4.8-7 c.M., petiolule 1-2.7 c.M. . . . 32
32. a. Caylx 0.1-0.15 c.M.; corolla-tube 0.3-0.4 c.M.; leaflets not acuminate . . . 24. **V. lasiantha**
b. Calyx 0.2 c.M.; corolla-tube 0.5-0.6 c.M.; leaflets long acuminate . . . 25. **V. longifolia**
33. a. Calyx truncate or nearly so . . . 34
b. Calyx distinctly 5-toothed . . . 35
34. a. Apex of leaflets obtuse or shortly and broadly acuminate . . . 16. **V. nitida**
b. Apex of leaflets long and narrowly caudate-acuminate . . . 15. **V. celebica**
35. a. Corolla-tube 0.4-0.5 c.M., the 4 smaller lobes reaching $^{1}/_{2}$-$^{1}/_{4}$ of this length . . . 36
b. Corolla-tube 0.8 c.M., or smaller, the 4 smaller lobes reaching $^{1}/_{6}$ of this length; calyx denticulate . . . 13. **V. heterophylla**
36. a. Corolla villous within, as are filaments . . . 37
b. Corolla within, and filaments, glabrous, sometimes a little villous at the base of the midlobe of the lower corolla-lip . . . 12. **V. sumatrana**
37. a. Leaflets eglandular beneath . . . 20. **V. secundiflora**
b. Leaflets very densely glandular beneath . . . 21. **V luteoglandulosa**
38. a. Leaves 1-foliolate, cinereous, leaflets 12-18 by 2.7-4.7 c.M.; petioles 1-2 c.M. . . . 26. **V. tetragona**
b. Leaves 3-5-foliolate, not cinereous . . . 39

39. a. Calyx-lobes 0.6-0.65 c.M. . . . . 27. **V. longisepala**
b. Calyx-lobes 0.2 c.M. 40
40. a. Calyx-lobes 0.15 c.M., abrupt . . . . . . 28. **V. medusaecalyx**
b. Calyx-lobes 0-0.05 c.M , not abrupt 41
41. a. Leaves glabrous beneath, or pubescent on or near the nerves only . . 45
b. Leaves ± pubescent beneath. 42
42. a. Inflorescences 2-6 by 2-6 c.M. 43
b. Inflorescences 9-19 by 3-17 c.M. 44
43. a. 1 Peduncle p. axil; leaflets with rounded apex . . 29. **V. hawaiiensis**
b. 2 Peduncles p. axil, leaflets with acute apex . . . . 30. **V. vestita**
44. a. Cymes dichotomous, lax, 1 p. axil . . . . . . 31. **V. leucoxylon**
b. Inflorescences paniculate, (1-)2 p. axil . . . . 32. **V. bogoriensis**
45. a. 3. Peduncles p. axil, inflorescence subspicate . . . 33. **V. Curranii**
b. 1-2 Peduncles p. axil 46
46. a. 1 Peduncle p. axil 50
b. (1-)2 Peduncles p. axil. 47
47. a. Leaves 3-4-foliolate, calyx 0.4 c.M., corolla-lobes langer than tube . .
. . . . 34. **V. Aherniana**
b. Leaves 3-5-foliolate, calyx 0.1-0.15 c.M. 48
48. a. Calyx teeth obtuse, 0.05 c.M., leaves 3-foliolate . . . 35. **V. venosa**
b. Calyx teeth acute, very small or none, leaves 3-5- foliolate . . . 49
49. a. Calyx truncate, 0.1 c.M., pedicels 0.1-0.5 c.M.; leaves 3-foliolate 36. **V. luzonica**
b. Calyx obsoletely toothed, 0.15 c.M., pedicels 0-0.15 c.M., leaves 5-foliolate
. . . . 32. **V. bogoriensis**
50. a. Terminal leaflets 10-31 by 4-13½ c.M., petioles 5.7-17 c.M., petiolules 1-4.7 c.M. 51
b. Terminal leaflets 9½-15½ by 3-8 c.M., petiolules 1.4-2 c.M.; petioles 3-8½ c.M. 52
51. a. 1 Peduncle p. axil, leaves glabrous beneath . . . 37. **V. glabrata**
b. (1-)2 Peduncles p. axil, leaves ± pubescent beneath . 32. **V. bogoriensis**
52. a. Cymes dichotomous, 12-17 by 12-17 c.M. . . . 31. **V. leucoxylon**
b. Inflorescences paniculate 53
53. a. 1-2 Peduncles p. axil, petioles 7-8½ c.M.; calyx 0.1 c.M., truncate . .
. . . . 36. **V. luzonica**
b. 1 Peduncle p. axil, petioles 3.7-5.3 c.M.; calyx 0.15 c.M., truncate or somewhat 5-toothed. . . . . 38. **V. bankae**

Imperfectly known or doubtful species:

41. **V. geniculata** 44. **V. Merrillii**
42. **V. Koordersii** 45. **V. padangensis**
43. **V. macrophylla**

Excluded species: 46. **V. bantamensis**

1. **Vitex altissima** L. F. Suppl. 294 (1781); Verb. 371.—*V. latifolia* WIGHT ex STEUD. Nom. ed. II, I, 777 (1841).—*V. pubescens* HEYNE ex WALL. Cat. n. 1755 (1828).—A large tree, 25 M. high; branchlets quadrangular, sulcate, densely grey-pubescent when young; leaves 3-foliolate; leaflets sessile or nearly so, lanceolate or ovate-lanceolate, chartaceous; acute at base and at apex, margins entire; young leaflets ovate, base broadly cuneate, apex schortly acuminate, margins serrate; lateral leaflets 7.2-14 by 2.7-5 c.M., sessile, terminal ones 13-18 by 6-7 c.M., petiolules 0.1-0.5 c.M.; pairs of nerves ± 10; petioles 3.8-6.2 c.M. long, unwinged near base, gradually becoming winged towards the apex, rotundate at apex and with a breadth of 8.0-1 c.M.; upper surface of leaves and petiole-wings glabrous; lower one somewhat pubescent or subglabrous; inflorescences terminal, composed, the lower cymes often axillary; calyx subinfundibuliform, densely and appressedly pubescent without, glabrous within except for the pubescent lobes; 0.2-0.3 c.M.; lobes acute, deltoid, 0.07-0.1 c.M.; corolla densely and appressedly pubescent without, violet; lobes 5, obtuse, subequal, 0.2 c.M. long; ovary densely pubescent.

In Herb. Bog, also from:

Sumatra: TEYSMAN, Kabagusan! Lampongs! H. B. n. 4287.

Java: KOORDERS n. 4 4484 β (forest nr. 449), Nusagede in Lake Pendjalu, 720 M. in alt., 31. VII. 1917; young leaves.

Distribution: British India! Java! Sumatra!

2. **Vitex alata** [1]) HEYNE, ROTH, Nov. pl. sp. 316 (1821); CLARKE in HOOK., Fl. Br. Ind. IV, 584.—Leaves 3-4 (5-6)-foliolate; leaflets lanceolate, acute, at base and at apex, 15-37 by 6-12 c.M.; upper side glabrous, lower one pubescent, very distinctly and prominently reticulate; leaflets ± sessile; petioles 7-15 c.M. long, winged, the wings narrow in the middlepart, rotundately and abruptly broadened at base, sometimes also at apex, together 0.4-1.5 c.M. broad; tomentum as in leaflets.

Distribution: Madras! Mysore! (CLARKE).

3. **Vitex cofassus** RW. ex BL. Bydr. 813 (1826); Verb. 172.

Var. α **typica** H. J. L., Verb. 173.—*V. monophylla* K. SCHUM in SCHUM. u. HOLLR. Fl. Kais. With. land 121 (1889).—*V. pnnctats* SCHAU. D.C. Prodr. XI, 687 (1847).—Leaves very rarely 2- or 3- foliolate (only observed in young specimens, cultivated in the Botanical Gardens of Buitenzorg, under the numbers: XI. K. 22, with many 2- and 3- foliolate leaves, and: XI. I. 29, with some 2-foliolate leaves; the leaflets are sessile; in the cultivated specimen XI. I. 29 we found one single case of 2 peduncles in one axil.

In Herb. Bog. also from:

Amboina: BOERLAGE n. 503.; ROBINSON n. 302.; TEYSMANN.—Sula Besi: HULSTIJN n. 404.—Mangoli: HULSTIJN n. 414, Banokuba, native name: Banafat.

Var. β **puberula** H. J. L., Verb. 174; New-Guinea.

Distribution of the species: eastern parts of Malay Archipelago and western parts of Polynesia.

4. **Vitex smilacifola** PEARS., Kew Bull. 59 (1907); Verb. 175.

Distribution: Sarawak (Borneo).

5. **Vitex erioclona** H. J. L., nov. spec.—Abor?; ramuli subquadrangulares, novelli striati, cum paniculis in sicco fulvo-cinereo-farinosi; folia 1- foliolata, articulatione indistincta; foliolum sessile, ovato-ellipticum, basi truncatum vel late cuneatum, apice acutum, margine integrum, nervis utrinque 7-12, paulo prominentibus, supra (in sicco) brunneum, glabrum, costa media puberulum, subtus densissime flavo-tomentosum; $9^1/_2$-15 c.M. longum, $4^1/_2$-5.7 c.M. latum; petiolo fulvo-cinereo-farinoso, supra sulcato, $1^1/_2$-$3^1/_2$ c.M. longo; panicula terminalis, base foliosa; cymis oppositis, multi-

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[1]) For the sake of completeness we mention this species to, although it does not occur in Malaya.

floris, inferioribus 10-14 c.M. longis, 4-6 c.M. latis, pedunculo 3-4 c.M. longo; bracteae foliaceae, ovato-lanceolatae, 0.3-0.45 c.M. longae, 0.15-0.2 c.M. latae; florem alabastri aetate tantum videmus; peducelli 0.1-0.5 c.M. longi; calyx cupularis, extus tomentosus, dentibus 5 minutis acutis suffultus; 0.2 c.M. longus; corolla alabastrum 0.5 c.M. longum, extus parte inferiore excepta puberulum, intus parte inferiore excepta omnino minute sparseque villosum, glabrum ab staminum insertione usque ad basin; stamina 4, parte inferiore tubi inserta, filamenta basi nonnulis pilis glanduliferis vestita: stylus gracilis, apice brevissime bifidus; ovarium basi striatum, apice laeve, nonnullis pilis vertitum.

Celebes: HEYNE, wood nr. 2563, Lako-Poso Menado.

6. **Vitex sarawakana** PEARS. Kew Bull., 60 (1907); Verb. 175.

Distribution: Sarawak (Borneo).

7. **Vitex Hollrungii** WARB., Engl. Jhrb. XVIII, 208 (1894); Verb. 179—Verb. 176—See 9. *V. Hollrungii* Warb.—*V subspicata* HALL. f., Med Rijks Herb. Leid. n. 37, 52 (1918); Verb. 177.—*V. Clarkeana* KING et GAMBLE, Journ. As. Soc. Beng. LXXIV, 4, 845 (1909); Verb. 178.—*V. simplicifolia* CLARKE IN HOOK. f. Fl. Br. Ind. IV. 586 (1885).—*V. holophylla* BAKER. Kew Bull. 25 (1896); Verb. 179.—all synonyms e.d.—A small tree, sometimes somewhat climbing (TEYSMANN); leaflets 11—34 c.M. long; the small corolla-lobes 0.1—0.3 cM. long.

In Herb. Bog. also from:

Banka: TEYSMANN, Merangkat. Sungei liat, near brackish river, fr. in Oct.—Borneo: TEYSMANN n. 8372, Kapuas; ID. n. 11596, Sungei Landak; JAHERI exp. (NIEUWENHUIS) without nr. or locality.—Celebes: Rachmat (v. Vuuren) n. 792, G. Sungkuwatawo.—Amboyna: ROBINSON n. 1867.—New-Guinea: JAHERI, Sungei Maraka-TEYSMANN, Mysole-Waigama. and, if the synonymy of *V. subspicata* and *V. holophylla* is true, also known from: Malacca (*V. Clark.*, *holoph.*) and Sumatra (*V. subspic.*). In this case the distribution should be:

Malacca!, Sumatra!, Banka!, Borneo!, Celebes!, Molucca's! (Amboya, Buru), New-Guinea!

The synonymy still seems somewhat doubtful as regards *V. subspicata* and *V. holophylla.* Especially the former species has leaves which do not exactly conform with those of *V. Hollr.*, being more gradually acuminate. It seems, however, rather probable that all these forms belong to a single species with a large extension; it may be that it is rather polymorphous, but in the materials extant at present, we could not separate any distinctly distinguishable forms, the extremes (as e.g. *V. subspicata* and the type of *V. Hollrungii*) being joined by a uninterrupted series of transition-forms.

8. **Vitex Agnus-castus** L. Sp. Pl. 890 (1753); Verb. 180.—A delineation may be found in: DU HAMEL DU MONCEAU, Traité des arbres et arbustes, II, 358, t. 105 (1755).

Distribution: a native of the medeterranean countries; imported into Java and W.-India.

9. **Vitex trifolia** L. Spec. Pl. II, 638 (1753); Verb. 180.—*V. incisa* WALL., Cat. No. 1746 (1827), pro parte.— *V. indica* MILL. Gard. Dict.

ed. VIII (1768) - *V. integerrima* MILL. l. c.— *V. triphylla* ROYLE, Ill. Bot. Him., 299 (1839).— *V. variifolia* SALISB., Prod. 107 (1790).— *V. repens* BLCO., Fl. Fil. ed. I, 513 (1837) (= var. β ?).— *V. rotundifolia* L. f. Suppl., 294.

Var. α **trifoliolata** SCHAUER, DC. Prodr. XI, 683; Verb. 182.— *Var. trifoliata* CHAM., Linnaea VII, 107.— A shrub, sometimes tree-like, up to 1100 M. in alt.; terminal leaflet sometimes somewhat petioluled. In Herb. Bog. also from:

Timor: FORBES n. 3726.— Banka: BÜNNEMEYER.— Sumatra: BÜNNEMEYER n. 2975, 5649; 4439; LÖRZING n. 5776; etc.— Borneo: LABOHM n. 1962.

This plant supplies the inhabitants with many remedies; rubbing with the leaves is considered to be a remedy against fever and lumbargo; a decoction of the young fruits with salt against tooth-ache; the fruits against an illness of native neat and horses; a decoction of all parts against fever. In order to accelerate the ripening of the rice, the natives plant this shrub near it; in arrogating the rice-fields they add the leaves to the water, in order to drive away the rice-caterpillar (mal.: „buwat kaluwar ular padi").

Native names, except Legundi or Ligundi: Salagundi (Sum.), Batang Lagundi (Lamp.), Géŋdarasi (Lamp.).

Transition— FORMS to var. β are the following specimens, most of them near the sea-shore, the common habitat of the var β, whilst the var α also occurs frequently in the inland.

Java: BACKER n. 15230, Tegal, dry plain behind the beach (leaflets smaller, with more rounded apex, more freguently 1- foliolate); ID. n. 4550, Tjilatjap, on the beach (just intermediate between var. α and β); BEUMÉE n. A. 92, Parang Tritis, south of Djocjacarta, at the foot of the sand-hills. — These forms, however, occur also in the mountain-regions: KOBUS n. 164, Tosari, Mt. Tengger; ZOLLINGER n. 2559 Mt Tengger; MOUSSET n. 1118, Wonosari 1100 M. in alt.—Madura: BACKER n. 21149 and 19895, near the sea-shore.

Var. β **unifoliolata** SCHAUER l. c. Verb. 182.—*Var. simplicifolia* CHAM. l. c.—*Vitex ovata* THB. Fl. Jap, 257; HOOK. et ARN., Bot. Beech. Voy., t. 47.

In Herb. Bog also from:

Java: BACKER n. 2880, Patjitan.— Madura: BACKER ns. 19976, 21226, 19583.— Mangoli: HULSTIJN n. 213.— All of them plants creeping on the sea-shore.

Distribution of the species: Mauritius! Réunion! Brit. India! Ceylon! Malacca! Siam! Hainan! S.-China! Korea! Andamans! Malay Archipelago! Philippines! Formosa! Liuchiu-isl! Japan! Polynesia!

10. **Vitex pubescens** VAHL, Symb. bot. III, 85 (1794); Verb. 183.— *V. arborea* ROXB. Fl. Ind. III, 73 (1832); Jack, Descr. Mal. Pl., Calc. Journ. Nat. Hist. IV, n. XIII, 40.—*V. articulata* STEUD. Nom., ed. II. II, 777 (1841).—*V. bracteata* MIQ. l. c. II, 826 (1856).—*V. digitata* WIGHT ex STEUD. l. c.—*V. heterophylla* BL. (not of ROXB.) ey MIQ l. c. II. 862.— *V. inaequiolia* TURCZ., Bull. Soc. Nat. Mosc. XXXVI, II, 223 (1863).— *V. latifolia* BLCO., Fl. Fil. ed. I, 514 (1837).—*V. latifolia* LAM. Encycl. II,

613 (1786).—*V. Negundo* NORONHA (not of L.), Verh. Bat Gen. V, ed. I; art, IV, 86 (1790).—A large tree, 10-30 (-50?) M. high; trunk irregularly buttressed; bark light or dark-grey; leaves variable from lanceolate to obovate with rounded apex, glandular beneath, pubescent on lower surface, sometimes on the nerves only; panicles bright grey-green; corolla white or yellow-green with lilac- veined lip, fragrant; drupe dark-brown or blackish.

In Herb. Bog. also from:

Java: BAKHUIZEN V.D. BRINK n. 907, Tji Emas, Preanger; BEUMÉE n, 1404, Madiun, flrs. white.—Sumatra: ? collector n. 322 (or 323 ?), Padang; BÜNNEMEYER n. 245, G. Ophir; V. DAALEN n. 478, Gaju-and Alas-Countries- LÖRZING n. 4494; DUMAS n. 1544, Rawas; JACOBSON n. 15, Bencoolen.—Banka: BERKHOUT n. 402, S. liat; BÜNNEMEYER ns. 1467, 1890, ? 1362, Muntok, flrs. violet, 90 M in alt., flowering respectively on 15. X. 1917, 13. X. 1917, 7. XI. 1917 and. 10. X, 1917.— Timor: DE CASTRO.—Borneo: LABOHM ns. 14, 1156 and. 1210.— Celebes: TEYSMNN ns 12526 and. 12487; RIEDEL n. 79, Gorontalo.Occuring up to an altitude of 700 M.

Native names: Laban or Leban (j., m.), Kiheuras or Keras or Ras or Hras (s.), Leban bunga, L. bungka or L. tungka or L. kunjit (m. S. O. K.), (Ha) laban tanduk or Haniban (S. W. K.). Manéh or Menéh (Atjeh), ? Leban sungu (j.).

Distribution: Br. India! Malay. Peninsula and Archipelago! Palawan! Indo-China!

11. **Vitex velutina** (K. et V.) KDS. Atl. Baumart, II, 6, t 297 (1914(; Verb. 185.—*V. heterophylla* ROXB. *var. velutina* KDS. et VAL., Bydr. Booms-Java, n. 7, 107 (1910)—*Leaflets* resembling those of *V. sumatrana* apex abruptly acuminate, subobtuse, base cuneate; terminal ones 9-21 by $4^{1}/_{2}$-10.2 c.M.; *petiolules* 1-2.5 c.M., petioles $2^{1}/_{2}$-13 c.M.; both surfaces with simple hairs, densier beneath.

In Herb. Bog. also from:

Java: KOORDERS ns. 40237 β, Tjilatjap, 24779 β and. 24703 β, etc., Nusa kambangan, 40237 β. Banjumas.—Sumatra: GUSDORF n. 128, Lampongs, Seputih-tulang-bawang, Gunung-sugih, 30 M. in alt.; a tree, 45 M. high, flrs. lilac and fragrant.—LUZON: Borden n. 3059. Lamao-riv., Mt. Mariveles, fr. in May 1905(determ. as *V. Turczaninowii*).

Native name: Tilleng (j.).

Distribution: Java!, LUZON!

12. **Vitex sumatrana** MIQ., Fl. Ind. Bat. suppl. 567 (1862); Verb. 186.

Var. α **typica** H. J. L., Verb. 186.— Java!, Sumatra! S. Andaman!

In Herb. Bog. from:

Java: DOCTERS VAN LEEUWEN-REIJNVAAN n. 503, Doro nr. Pekalongan, buds on 2. VI. 1912 (tomentum of the panicle greyish yellow [1]).— S-Andaman: KING's coll., Manpur Hill, jungle, flow. on 3. VI. 1893 (tomentum ferrugineous) [1].

Native name: Tilleng (j.)

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[1] Note of the author.

Var. β **urceolata** KING et GAMBLE, Journ. As. Soc. Beng., LXXIV, 4, 849.— *V. heterophylla* SCHAU. (not of ROXB.) (partly), DC., Prodr. XI, 686 (1847).— *V. Loureirii* WIGHT ex C. B. CLARKE in HOOK. f., Fl. Br. Ind. IV, 585 (1885).— *V. urceolata* C. B. CLARKE l. c.; Malay Peninsula.

Distribution of the species: Malay Peninsula! Sumatra! Java!, S.-Andaman!

13. **Vitex heteropylla** ROXB., Fl. Ind. III, 75 (1832); Verb. 187.— *V. Babula* BUCH.-HAM. ex WALL. Cat n. 1745 (1827).— *V. quinata* WILLIAMS, Bull. Herb. Boiss. sér. II, V, 431 (1905).— V. *undulata* WALL. Cat. n. 1756 (1827).

Var. α **genuina** H. J. L., nov. var.— *Folia* $17^1/_2$ c.M. longa, 6.3 c.M. lata, supra glandulis albis, subtus glandulis flavis vestita; petiolulus folioli terminalis 0.6-1.2 c.M. longus; petiolus 5 c.M., glaber; *panicula* 20 c.M. longa, 15 c.M. diam., densa; bracteae 0.3 c.M. longae; *calyx* truncatus; *corolla* 0.6 c.M. longa, flava, lobo labii inferioris medio coeruleo; *drupa* 0.5 c.M. longa, apice glabra (after CLARKE in Hook. f., Fl. Br. Ind. IV, 585).

In Herb. Bog. from;

Burma: PRAZER n. 7.— Sumatra: GUSDORF n. 91, Lampongs, flrs. light-violet.

Distribution: Assam! Bengal! (CLARKE), Burma!, Sumatra!

Var. β **undulata** CLARKE in Hook. f., l. c.— *Var. α typica* H. J. L., Verb. 188.— *Leaflets* smaller, in the upper leaves 3 together, often denticulate or serrulate when young, branchlets and nerves glabrous; sometimes somewhat pubescent near the midrib; 7-8-10 c.M. long, 2.7-3-$4^1/_2$ c.M. broad, *petiolules* 0.7-1.7 c.M., *petioles* 3-10. c.M.; *corolla* rather variable, 0.4-1 c.M., dirty-violet, lip with dark-violet spot; a tree or tree-like shrub, 6-32 M. high.

In Herb. Bog. from:

Java: LÖRZING n. 17102, 16567, etc.; BACKER n. 1934, etc.— Sumatra: TEYSMANN n. 3783, Palembang; LAMBACH n. 1221, Palembang.— Celebes: TEYSMANN n. 11994, Pangkadjine.— Reaching an altitude of 1300 M.

Native names: Til(l)eng or Sileng (j.), Laban ketileng, Ki-bangbara, Laban kuning, L. semut, L. leutik (s.), Sepat laut.

Distribution: Java!, Sumatra!, Celebes!, Philippines!

Var. γ **puberula** (Miq.) H. J. L. (= var. β puberula (Miq.) H. J. L., Verb. p. 189).

In Herb. Bog. from:

Molucca's: Batjan, without coll. and nr.—Java: KOORDERS-ZOLLINGER et MORITZI n. 2670, Kraksaän-Ngarengan, in forest of *Tectona grandis*, without coll. and nr.

Distribution: Java!, Sumatra! Celebes! Molucca's!

Distribution of the species: India! Hongkong! Formosa! Malay Peninsula! Java! Sumatra! Celebes! Philippines! Molucca's!

14. **Vitex Negundo** L., Sp. pl. 638 (1753); Verb. 189.— *V. arborea* DEFS., Cat. Hort. Par. ed. III, 391 (1829).— V. *gracilis* SALISB., Prodr., 107

(1796)—V. *incisa* LAM., Encycl. II, 612. (1786).— V. *laciniata* HORT. ex, SCHAUER, l.c., 684 (1847).— V. *leucoxylon* BLCO., Fl. Fil. ed. I. 516 (1837).— V. *paniculata* LAM. l.c., 612.

Var. α **typica** H.J.L., Verb. 191—A shrub; *leaflets* often ± serrate, reaching: the lowest ones 8 by 3.4 c.M., *petiolules* 0.6 c.M., the lateral ones 13½ by 4 c.M., petiolules 2.2 c.M., the terminal ones 16½ by 4.8 c.M., petiolules 2.7 c.M., petioles 8½ c.M.

In Herb. Bog. also from.

Java! (BACKER, VORDERMAN, SCHEFFER),—Banka! (BERHOUT n. 440, S. liat),—Billiton! (TEYSMANN n. 16728)—Whampoa! (HANCE n. 951)—Japan! (MAXIMOWICZ) (*V. cannabiolia* S.)— Tsingtau! (ZIMMERMANN n. 442)— British India!

Var. β **bicolor** H. J. L., Verb. 191.—*V. bicolor* WILLD. Enum. Hort. Benl. 606 (1809).

In Herb. Bog. also from:

Amboyna! (ROBINSON)—Carolines! (VOLKENS n. 425, s. also Verb. 193).

Distribution of the species: E.-Africa! N.-Madagascar! Mauritius! Ceylon! India! Siam! S.-China! Hainan! Formosa! Japan! Malay Peninsula and Archipelago! Philippines! W.-Polynesia!

15. **Vitex celebica** KDS. Med. 's Lands Pl.-tuin XIX, 645 and 560 (1898); Verb. 211.—A tree, 20-45 M. high; *leaves* 3-5- foliolate: leaflets ovate or elliptical, base broadly cuneate, apex long and narrowly caudate-acuminate, margins entire, often serrate when young, chartaceous; upper surface minutely white-verrucose, lower one glandular, both sides glabrous except on the midrib beneath, which is minutely pubecent; lowest leaflets, if present, 7½-10 by 3.4-4.5 c.M., acumen 1-1½ c.M., petiolules 0.9-1.2 c.M., pairs of nerves ± 9; lateral ones 10-18 by 4-7 c.M., apex 1½-2 c.M., petiolules 1.7-2.8 c.M., pairs of nerves 10-12; terminal ones 12½-19 by 5-7.2 c.M., acumen 2-2.3 c.M., petiolules 2½-3 c.M., pairs of nerves 12-13; petiolules glabrous or nearly so, 9-14½ c.M. long; petiolules usually minutely puberulous; *calyx* truncate, 0.2 c.M. long and in diam., minutely tomentose, glandular; pedicels 0-0.2 c.M.; *corolla*, except for the lower part of the tube and near the mrgin of the midlobe of the lower lip, pubescent and glandular without; tube 0.3 c.M., villous near the insertion of the stamens and at the base of the midlobe of the lower lip; lobes 5, 4 smaller, rounded, 0.1 c.M. long, 1 larger, 0.2 c.M. long; *stamens* didynamous, hardly exserted, inserted in the throat, 0.25 and 0.3 c.M. long; *style* 0.6 c.M. long, bifid at apex; *ovary* glabrous; drupe globose, 0.5-0.7 c.M. in diam; flowers yellowish white or yellowish green.

In Herb. Bog also from:

Celebes!,—? Banka (TEYSMANN n. 22).— Timor! (FORBES n. 3784).— Leyte! (FRANCO n. 26871), fr. in June 1917, reaching an altitude of 500 M.

Native names: Gofasa batu, Gofasa gaba, Sau or Saho, Sau-masarawet, Masarawet-sela, Papakelan (tw.), all of them from Celebes.

Distribution: Celebes! Banka! Timor!. Leyte!

16. **Vitex nitida** MERR. Phil. Journ. Sci. Bot. VII, 343 (1912); Verb. 194.

Distribution: Mindanao!

17. **Vitex parviflora** JUSS. Ann. Mus. Par. VII, 76 (1806); Verb. 213.— *V. littoralis* DECNE. Nouv. Ann. Mus. Par. III, 401 (1834); Verb. 194.— *V. Loureirii*! HOOK, et ARN., Bot. Beech. Voy., 206, t. 48 (from China) (1841).— *V. altissima* NAVES ex F.-VILL. Nov. app. 130 (1877).— *V. timoriensis* WALP. Rep. IV. 84 (1848).— *V. glaberrima* ZIPP. ex SPAN., Linnaea XV, 330 (1841).— *V. leucoxylon* SPAN. l.c.— *V. cofassus* RW. *var. timorensis* HOOK. f. Med. 's Rijks Herb. Leid. n. 37, 47 (1918)—Inflorescences normally rather lax, very dense only in the case of presence of sterile flowers or fruits; COROLLA 0.8-1.1 c.M.; *drupe* normally 0.4 c.M. in diam., 0.9 c.M. whed sterile and inhabited by insect-larvae. Many specimens show the particular sterility of the flowers and the fruits, mentioned on p. 214 of the „Verb.". The enlarged fruits have their upper wall increased considerably; in this wall are a rather large number of holes, rounded above, in which live the larvae of an insect, one in each hole; [1]) the cells below them do not contain an ovule.

In Herb. Bog. we examined the following:

a. *fertile* specimens:

Philippines:

Mindanao: REILLO n. 16463, Zamboanga, flrs. in Sept.-Oct. 1912.— ELMER n. 11031, Todaya, flrs. in June 1909.—AHERN nos. 504 Q (? 1504 Q) and 659 Q.—WHITFORD and HUTCHINSON n. 9213, Zamboanga, flow. in Jan. 1918.

Luzon: DARLING n. 14891, Pangasinan, flow. in May 1909.—BERNARDO, n. 15139, Cagayan, flow in May-June 1912.—CURRAN n. 4899, BAGUIO flow. in Aug. 1906; ID. n. 5844, Zambalez. Jan. 1907.—CURRAN et MERRITT. n. 12398, Mt. Limay, buds in Aug, 1908; ID. n. 7712, Batanges, flrs. and young fr. in Nov. 1907.— MERRITT. n. 18016, Benguet, Dec. 1908.— REYES n. 7470, Tayabas, fr. in July 1907.— Kemme n. 5247, Cagayan, flrs. in Aug.-Sept. 1906.—MANGUBAT n. 1361, Mendez, Numez, flrs. in Aug. 1906.—BORDEN n. 771, Lamao- riv., flrs. in Nov. 1904.—AQUILAR n. 6016, Zambalez, Jan. 1907.— AKERN n. 37 Q.—ELMER n. 17286, fr. in Sept. 1916; id. n. 18089, buds in June-July 1917.—RAMOS n. 1867, fr. in Aug. 1914.

Camarinez: CURRAN n. 10654, flow. in June 1908.

Mindoro: MERRITT n. 8561, fr. in Jan. 1908.—ROSENBLUTH n. 12219, Apr.-June 1908; ID. n. 11326, Bulacacao, May 1908.—BERMEJOS n. 1522, Bulacacao, flow. in Aug.-Sept. 1906.

Basilan: Hutchinson. n. 6125.

Sibuyan: ELMER n. 10995, Magellanes, flow. in May 1910.

Negros: CURRAN n. 17452, Sept. 1909.—EVERETT n. 5548, Negr. Occid., flow. in July-Oct. 1906.

Masbate: CLARK n. 2526, flow. in Oct. 1904.

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[1]) Dr. DOCTERS VAN LEEUWEN informs us kindly, that the insect is a CECIDOMYA.

Saleyer: TEYSMANN n. 13813.

Timor: TEYSMANN ns. 8936, 8941, 8944, Kupang; ID. n. 8935, P. Samano; native name: Kulah.

Java: HOUTER n. 171, Cheribon.

b. *partly sterile* specimens (with both fertile and sterile flowers in the same inflorescence):

Luzon: AHERN n. 3750.—FENIX n. 3, Union.

Mindanao: ELMER n. 14218, Mambojao, Camaguio, flrs. and young fr. in Nov. 1912.

c. *Sterile* specimens:

Mindanao: AHERN n. 389 Q (?3890).

Luzon: AHERN ns. 826 Q and 7520.—AHERN'S Coll. n. 2158, Rizal, flow. in Dec. 1914.—BORDEN n. 2022, Lamao-riv., flrs. and young fr. in Sept.-Dec.—ALVARES n. 22120, N. Ecijas, flow. in Dec. 1910.—TAMESIS n, 11903, Los Banos, flow. in Jan. 1910.—MERRILL, Pl. Blanc. n. 340, Angat, firs. and young fr. in Aug. 1913.

Bohol: MC. GREGOR n. 1218, flow. in May 1906.

Panay: ACHACASO n. 25361, flow in Apr. 1916.

Distribution: Timor!, Java!, Kalao-toa! Kape-adi! Saleyer! Celebes! Amboyna! Philippinel!

Sterility as mentioned above seems to occur only in the Philippines.

18. **Vitex siamica** WILLIAMS, Bull. Herb. Boiss., Sér. II, V, 431 (1905); Verb. 197.

Distribution: Siam! Malay Peninsula!

19. **Vitex flabelliflora** HALL. F., Med. 's Rijks Herb. Leid. n. 37, 50 (1918); Verb. 198.

Distribution: E.-Borneo!

20. **Vitex secundiflora** HALL. F., Med. 's Rijks Herb. Leid n. 37, 49 (1918); Verb. 198.

Distribution: S. E.-Borneo!

21. **Vitex luteoglandulosa** H. J. L., Verb. 199. (1919).

Distribution: E.-New- Guinea!

22. **Vitex glandulosa** H. J. L., Verb. 199 (1919).

Distribution: Luzon!

23. **Vitex coriacea** CLARKE in HOOK. f., Fl. Br. Ind. IV, 586 (1885); Verb. 200.

Distribution: Malay Peninsula!

24. **Vitex lasiantha** HALL. f., Med. 's Rijks Herb Leid., n. 57, 50 (1918); Verb. 201'

Distribution: S. W.-New-Guinea!

25. **Vitex longifolia** MERR., Phil. Journ. Sci. Bot. V. 227 (1910); Verb. 201— Branchlets striate; leaves 3—4 (—5?) foliolate; terminal leaflets 12—23 by 4.3—7.2 cM.; petiolules 1.5—2.1 c.M.; lateral ones $10^1/_2$—19 by 4.3—6.5, pertiolules 1.2—1.8 c.M.; petioles 2.8—7 c.M.; panicles rather few-flowered, subglabrate, 2—4 peduncles p. node: bracts deltoid, 0.2—0.3

by 0.1—0.15 c,M.; calyx sparsely pubescent, sometimes suglabrate; corolla villous in throat; ovary glabrous, obconoidal, somewhat ribbed.

In Herb. Bog. from:

Celebes: TEYSMANN n. 11785, Pangkadjene.

Distribution: Mindanao! Celebes!

26. **Vitex tetragona** HALL. f., Med. 's Rijks Herb, Leid., n. 37, 53 (1918); Verb. 202.

Distribution: E.-Borneo!

27. **Vitex longisepala** KING et GAMBLE, Kew Bull., 112 (1908); Verb. 202.

Distribution: Malay Peninsula!

28. **Vitex medusaecaly** H. J. L., nov. spec.—Frutex arborescens, 3-5 M. alta; innovationes brunneo-farinosae; folia 3-foliolata; folia ovata, apice acuminata, basi cuneata, interdum gradatim decurrentia, margine integra, membranaceo-chartacea; supra sparse puberula, nervis densius vestitis, novella flavo-glandulosa, subtus molliter pubescentia, sparseglandulosa; lateralia 6 1/2-8 1/2 c.M. longa, 2.1-4.1 c.M. lata, petiolulo 0.4-0.7 c.M. longo, nervis utrinque 6-7; terminalia 8-12 1/2 c.M. longa, 3.9-5.8 c.M. lata, petiolulo 1.8-3 c.M. longo, nervis utrinque 7-8; petiolus puberulus, 5-9 c.M. longus; cymi axillares; plerumque 1, interum 2 pedunculi in axilla; cymi bis dichotomi, 2 1/2-3 1/2 c.M. longi; pedunculi 1.2-2 c.M. longi; bracteae, aetate alabastrorum lineares, 0.3-0.5 c.M. longae, deinde caducae; pedicelli 0.2-0.6 c.M. longi, graciles, duobus bracteolis oppositis, linearibus suffulti; calyx per anthesin 0.4 c.M. longus, tubo cupulare, lobis vittiformibus vel lato-linearibus, abruptissimis, 0.15 c.M. longis, 0.05 c.M. latis, sinubus rectis; extus pubescens; corollam aetate alabastri tantum videmus; tubo longo, cylindrico, 0.35-0.4 c.M. longo, lobis rotundatis 4 minoribus (in alabastro 0.05 c.M. longis), 1 majore (in alab. 0.1 c.M. longo); extus, parte inferiore excepta, puberulam, 0.45 c.M. longam; stamina prope basin tubi inserta, tubo intus circum et prope staminum insertionem annulo pilorum rigidorum vestito, aliis sursum, aliis deorsum versis; stylo gracili, apice brevissime bifido; ovarium glabrum in parte inferiore, glandulosum in parte superiore; fructus ± globosus, 0.6 c.M. longus, 0.5-0.6 c.M. diametro.

Sumatra: LÖRZING n. 4761, 1250 M. in alt., nr. Bandar baru; a treelike shrub ± 5 M. high; flowers yellow, drupe black, both of them on 15. II. 1917; ID. n. 4566, same locality; erect, branched shrub, 3 M. high; flrs. yellow, innovations chocolate-coloured, 30. XII. 1916.

This species is very nearly related with *V. vestita, glossocalyx* and *neglecta*; it is, however, always distinguishable by its curious meduselike calyx. Perhaps the subdivision of the genus into the sections *Glossocayx* and *Euagnus* is not the right one, at least not that, which corresponds with the natural relations within the group.

29. **Vitex hawaiiensis** H. J. L., nov. spec. — Frutex? — ramuli novelli teretes, cum cymis petiolisque tomentelli; folia 3-foliolata; foliola ovata, basi cuneata, apice rotundata, supra dense minuteque pubescentia, subtus tomentosa (pilis simplicibus); lateralia 1.8-2.3 c.M. longa, 1.4-2.2 c.M. lata, nervis utrinque ± 5, petiolulo 0-0.1 c.M. longo; terminalia 4.2-8.3 c.M. longa; 1.9-3.2 c.M. lata, nervis utrinque ± 10; petiolulo 0.2-0.7 c.M. longo; petiolo

1.8-5.3 c.M. longo; cymi axillares, in axillis solitarii, bis dichotomi, (sine floribus) 3-3 $^1/_2$ c.M. longi, 2-2 $^1/_2$ c.M. lati, pedunculo 2-2.3 c,M. longo; bracteae nullae; calyx griseo-pubescens, cupularis, supra 5-costatus, 5 dentibus minutis acutís suffultus, 0.25-0.3 c.M. longus et diametro; pedicell, 0-0.2 c.M. longi, duobus bracteolis minutissimis suffulti; corolla 0.9 c.M. longa, extus, parte inferiore excepta, dense puberula; tubo 0.55 c.M. longo, intus fauce, basique lobi labii inferioris medii villoso, ceterum glabro; lobis 4 minoribus rotundatis, 0.3-0.4 c.M. longi, 0.2-0.4 c.M. lati, uno majorei rotundato, 0.6 c.M. longo, 0.5 c,M. lato; stamina exserta, sub fauce inserta, didynamia, 0.5 et 0.6 c.M. longa; stylus exsertus, apice brevissime bifidus, 0.7 c.M. longus; ovarium glabrum; fructus (novellus?) 0.4 c.M. longus.

Oahu: CURRAN n. 127, flow. in Apr. 1911.

30. **Vitex vestita** WALL. ex SCHAU., DC. Prodr. XI, 692 (1847); Cat. n. 1750 (1828); Verb. 205—*V. Finlaysoniana* WALL. Cat. n. 6314 (1828)—filaments red.

In Herb. bog. also from:

Java! (SCHEFFER), Banka! (Muntok, TEYSMANN), Sumatra! (BUURMAN V. VREEDEN n. 159 Herb. var. bot., Palembang).

Distribution: Burma! Malay Peninsula! Penang! Sumatra! Banka! Borneo! Java!

31. **Vitex leucoxylon** L. f. Suppl. 293 (1781); Verb. 208 — *V. saligna* ROXB., Fl. ind., III, 75 (1832)—*Leaflets* lanceolate, acute at base and at apex. A young specimen cultivated in the Botanical Gardens of Buitenzorg shows the lower leaves alternate and 1-foliolate, the higher placed ones alternate and 3-foliolate, the uppermost ones opposite and 3-foliolate.

Distribution: Ceylon! India! Malay Peninsula! Java!

32. **Vitex bogoriensis** H. J. L., nov. spec. —Arbor?; ramuli subquadrangulares,subsulcati, cum imflorescentiis, petiolis, petiolulis dense ferrugineo-pubescentes; *folía* 5-foliolata; foliola oblonga-elliptica vel elliptico-lanceolata, in sicco atro-brunnea, basi acuta, apice acuminata, margine integra, nervis utrinque 10-16, costa media fere perpendicularibus; supra glabra, in nervis minute pubescentia, subtus sparse pubescentia vel subglabra, nervis valde prominentibus, dense pubescentibus, reticulatione indistincta vel nulla; inferiora 8$^1/_2$-15$^1/_2$ c.M. longa, 3-5 c.M. lata, petiolulo 1.1-2.8 c.M. longo; lateralia 9-20 c.M. longa, 3$^1/_2$-7$^1/_2$ c.M. lata, petiolulo 1-4.3 c.M. longo; terminalia 10-24 c.M. longa, 4-10 c.M. lata, petiolulo 1-4.7 c.M. longo; petiolo striato, 5.7-12$^1/_2$ c.M longo; inflorescentiae panuculatae plerumque 2, interdum 1 in axilla positae, 9-19 c.M. longae 3-11 c.M. latae, pedunculo 2$^1/_2$-6 c.M. longo; bracteae minutae, caducae, 0.1 c.M. longae; flores subsessiles, plerumque trini compositi; calyx cupularis, sparse pubescens, 0.15 c.M. longus, trinorum laterales in peducello 0.15 c.M. longo insiti; margine 5 dentibus minutis acutis suffultus, sinubus latis interdentalibus; trinorum peducellus communis 0.2 c.M. longus; cetera non videmus.

In Herb. Horti Bog.; formerly cultivated sub signo XI H. 37 in the botanical gardens of Buitenzorg (Bogor), and imported from Banka.

Our species has a close affinity with *V. bankae*, but in the absence of a more complete material, we separate it from that species, because of the differences, noted in the descriptions.

33. **Vitex Curranii** H. J. L., Verb 207 (1919).

Distribution: Philippines (Negros)!

34. **Vitex Aherniana** MERR., Bur. Gov. Lab. Bull. no. 6, 18 (1903); Verb, 206.

Distribution: Philippines!

35 **Vitex venosa** H. J. L., nov. spec.—Arbor 18 M. alta, trunco erecto, gracili, tereti, vertice latissimo, multibrachiato; ramuli teretes, glabri, curvissimi, tenues; cortex brunneus; folia 3-foliolate; foliola oblongo-lanceolata, utrinque acuta, margine integra, coricea, utrinque glaberrima, eglandulosa; supra in sicco grisea, ± bullata, subtus reticulatione prominente suffulta; petiolus glaber, supra sulcatus, persectione transversa semilunare, basi apiceque incrassatus; foliola lateralia 5.3-6.3 c.M. longa, 2-2.6 c.M. lata, petiolulo 0.5-0.6 c.M. longe; terminalia 7.7-10.7 c.M. longa, 2.7-4.5 c.M. lata, petiolulo 0.8-1.3 c.M. longo; petiolus 3-3.8 c.M. longus; paniculae axillares, superiores solitariae, inferiores binae in axilla, sparse ferrugineo-pubescentes cymulis parvis oppositis, paucifloris, inferioribus quaternis in nodo positis (duobus superioribus majoribus, 5-12- floris, $1^{1}/_{2}$-3 c.M. longis, pedunculo 0.7-1.8 c.M. longo, duobus inferioribus minoribus, 2-4-floris, 0.5-0.7 c.M. longis, superioribus binis in nodo positis, parvis, 5-1- floris, 0.5-1 c.M. longis; bracteae lineares 0.2-0.35 c.M. longae; paniculae totae 4-11 c.M. longae, $1^{1}/_{2}$-2 c.M. latae, pedunculo 2.3-6 c.M. longo; calyx subsessilis. campanulatus, sparse pubescens vel subglabratus, 0.15 cM. longus, dentibus 5 (interdum 6) deltoideis obtusis, 0.05 c.M. longis; *corrolla*, parte inferiore excepta, extus dense minuteque puberula, 0.9 c.M. longa, tubo angusto-infundibuliforme, 0.5-0.55 c.M. longo, intus glabro, prope staminum insertionem annulo pilorum rigidorum vestita, basi lobi labü inferioris medii rigido-barbato; lobi 4 minores, deltoidei, subacuti, utrinque pubescentes, 0.15-0.2 c.M. longi et lati, unus major 0.25-0.4 c.M. longus, 0.25-0.35 c.M. latus, venosus, margine irregulariter sinuato-undulatus; stamina didynamia, 0.5 et 0.6 c.M. longa, exserta, ± 0.2 c.M. a basi tubo inserta, filamentis basis lateraliter compressis, sparse pubescentibus; stylus longe exsertus, 1 c.M. longus, stigmate breviter bifido, lobis horizontaliter divergentibus vel paulo recurvis; *ovarium* glabrum.

Sumatra: GRASHOFF n. 890, Banjuasin- and Kubu- countries; Palembang, flw. on 24. XII. 1915, 20 M. in alt., in the forest, flrs. Heliotropium-coloured, with a little agreeable fragrance; native name: Krindjing daun talang.

36. **Vitex luzonica** H. J. L., nov. spec.- Arbor?, ramuli glabri, acute quadrangulares; folia 3-foliolata, foliola ovata, basi late cuneata, apice breviter acuminata, margine integra, chartacea, in sicco supra atra, subtus grisea; utrinque glaberrima; nervis utrinque 8-11; lateralia $8^{1}/_{2}$-$10^{1}/_{2}$ c.M. longa, 4.6-6.4 c.M. lata, petiolulo 1.3-2.1 c.M. longo, terminalia $9^{1}/_{2}$-12 c.M. longa, 4.5-7 c.M. lata petiolulo 1.4-2 c.M. longo; petiolus glaber, 7-$8^{1}/_{2}$ c.M.

longus; paniculae axillares, solitariae vel binae in axilla, componentes paniculam magnam terminalem, basi foliatum; $13^{1}/_{2}$ c.M. longae, 6 c.M. latae; bracteae nullae; pedicelli graciles, 0.1-0.5 c.M. longi; calyx cupularis, truncatus, subglabratus, 0.1 c,M. longus; corolla extus glabra, sparse glandulosa, fauce minute rigido-barbata, pilis rigidis prope staminum insertione; tubus 0.4-0.45 c.M., subcylindricus; lobi 4 minores rotundati, 0.1-0.15 c.M. longi, unus major, 0.35 c.M. longus, 0.3 c.M. latus; stamina exserta, didynamia, 0.4 et 0.55 c.M. longa, filamentis basi pubescentibus, prope basin tubi insertis; stylus exsertus, 0.75 cM. longus, stigmate brevissime bifido; ovarium glabrum.

Luzon: AHERN n. 760 Q.

37. **Vitex glabrata** R. BR. Prodr. 512 (1827); Verb. 203—*V. minahassae* KDS. Med. 's Lands Pl. t. XIX, 560 and 645 (1898); Verb. 213—*V. Cunninghamii* SCHAU., DC., Prodr. XI, 691 (1847)—*V. helogiton* K. SCHUM. in K. SCHUM. u. LAUTERB., Fl. D. Südsee, Nachtr. 362 (1905)—*V. leucoxylon* SCHAU. l. c. (partly)—*V. pallida* WALL. Cat. n. 1751 (1828)—*V. pentaphylla* MERR. Phil. Journ. Sci., Bot. VI, 320 (1909)—*V. bombacifolia* WALL. l. c. n. 1749 (1828)—Leaflets membranous when young, in sicco black, the nerves whittish with hairs, aldult grey-brown, coriaceo-chartaceous; pairs of nerves 6-17; petiolules of the terminal leaflets 0.7—3.7 c.M.; petioles 7-25 c.M.; corolla minutely pubescent.

In Herb. Bog. also from:

Java! (Koorders, Beumée n. 675, Japara), Celebes! (Ham n. L. 4, Muna-Koorders n. 19553 β, Minahassa) and Luzon! (Ahern n. 1104 (nr. 110 Q?), reaching an altitude of 800 M. (Koorders, Java).

Native names: Bigbul (s.), Laban or (Ketileng or Gentileng (j.) Distribution: India! Burma! Siam! Cochin China! Malay Peninsula! Java! Timor! Celebes! New-Cuinea! Palawan! Mindadao! Luzon! N.-Australia! Queensland!

38. **Vitex bankae** H. J. L., nov. spec.—Arbor, 20—25 M. alta (GRASHOFF); ramuli teretes, glabri; folia 3—4 (—5) foliolata; foliola ovata vel ovato-elliptica, basi apiceque acuta vel plus minus acuminata, margine integra, coriacea, in sicco brunnea, supra glabra, subtus glabra vel subglabra, in nervis et prope nervos puberula; nervis utrinque 7—10, angulo magno a costa media divergentibus; foliola lateralia 7—12 c.M. longa, 2.8—5 c.M. lata, petiolulo 0.6—1.4 c.M. longo, terminalia 9.2—$15^{1}/_{2}$ c.M. longa, 4.6—8 c.M. lata, petiolulo 1.5—2 c.M. longo; petiolus glaber, apice pubescens, 3.7—5.3 c.M. longus; paniculae axillares, in axilla solitariae [1]), laxae, pauciflorae, subpubescentes, 9—$14^{1}/_{2}$ c.M. longae, brachiatae, ramulis, gracilibus, subspicatis, 4—5 c.M. latae, pedunculo 2—3 c.M. longo; bracteae minutae, lineares vel angusto deltoideae, 0 1 c.M. longae; calyx cupularis, 0.15 c.M. longus, subglaber, truncatus vel dentibus 5 indistinctis, fructifer truncatus, 0.25 c.M. longus, 0.4 c.M. diametro; ovarium glabrum; fructus 0.3—0.4 c.M. diametro, globosus, glaber; corollam etc. non videmus.

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[1]) Rarissime binae (GRASHOFF n. 36, casu unico).

Banka: TEYSMANN, Blinju; ID., Menumbing; ID., Djebus, native name: Kaju melati; the leaflets reach a length of 24 c.M., a breadth of 10 c.M., the petiolules 4$^1/_2$ c.M., the petioles 12$^1/_2$ c.M.; GRASHOFF n. 36, Blinju, flrs. just cast off on 17. X. 1914; native name: Melàk; 25 M. in alt., scattered in the forest; trunk straight or curved, round, free from branches for a long distance, small-buttressed.

Our species is closely related to *V. Aherniana*, but differs from it by its much smaller calyx and the usually solitary peduncles in the axils

39. **Vitex gamosepala** GRIFF. Notul. II. 178 (1851); Verb. 209—Cymes solitary in the axils.

Var. α **typica** H. J. L., Verb. 210.; Malay Peninsula!

Var. β **Scortechinii** KING et GAMBLE, Journ. As. Soc. Beng. LXXIV, 4.856 (1909); Verb. 210; Malay Peninsula! Sumatra!

Var. γ **Kunstleri** KING et GAMBLE, l. c.; Verb. 210; Sumatra! Borneo! Malay Peninsula!

Distribution of the species: Malay Peninsula! Sumatra! Borneo!

40. **Vitex neglecta** H. J. L., nov. spec.—Frutex?, 4 M. alta (JACOBSON-AJOEB); ramuli obtuse quadrangulares, subglabri vel molliter farinosi; folia 3-foliolata; foliola oblongo-lanceolata, basi cuneata, apice longe acuminata, margine integra, membranaceo-chartacea; nervis utrinque 7-9; supra glabra vel subglabra vel subpubescentia, nervis pubercentia, subtus plus minus pubescentia, nervis densius vestitis, rubro-glandulosa; foliola lateralia 7-10 c.M. longa, 2.2-3.8 c.M. lata, apice 1$^1/_2$-2 M. longo, petiolulo 0.1-0.8 c.M. longo; terminalia 9-13.8 c.M. longa, 3.2-5.4 c.M. lata, apice 2-2$^1/_2$ c.M. longa, petiolulo 0.7-2.5 c.M. longo; petiolus glaber vel pubescens, 4-7$^1/_2$ c.M. longus; cymi bini vel terni in foliorum axillis, dichotomi, pubescentes vel glabri, 2-4 c.M. longi, 3-5 c.M. diametro, pedunculo 0.6-1.2 c.M. longo; bracteae minutae, 0-1 c.M. longae; calyx cupularis, sparse pubescens vel glaber, dense rubro-flavo-glanduloso-punctatus, 0.15-0.4 c.M. longus, bilabiatus, labio inferiore bidentato, superiore acuminato, plus minus elongato, 0.1-0.2 c.M. longo; pedicelli 0.2-0.7 c.M., graciles, saepe 2 bracteolis minutis suffulti; corolla extus glabra, parte inferiore excepta glanduloso-punctata; tubus cylindricus, 0.9 c.M. longus, intus glaber, annulo pilorum rigidorum parte inferiore insito (prope staminum longiorum insertionem) excepto; lobi 4 minores rotundati, 0.15 c.M. longi, 1 major, 0.3 c.M. longus, 0.2 c.M. latus; stamina didynamia longitudine valde differentia 0.2 et 0.7 c.M. longa, duo fauco dueo prope basin inserta, exserta; stylus exsertus 1 c.M. longus apice breviter bifidus; ovarium apice dense glandulosum.

Var. α **puberula** H. J. L., nov. var.—Foliola, petioluli, petioli, cymi, densiuscule pubescentes; cymi 4 c.M. longi, 5 c.M. diametro, pedunculo 1.2 c.M longo; calyx pubescens, tubo 0.3 c.M. longo, labio inferiore 0.1 c.M. longo, superiore 0.2 c.M. longo.

Sumatra: AJOEB (JACOBSON) n. 182, Bencoolen, Rimbo pengadang, 1000 M. in alt., flowers yellow on 16. VI. 1916.

Var. β **glabior** H. J. L., nov. var.—Foliola, petioluli, petioli, cymi glabri vel subglabri: cymi 2 c.M. longi et diametro, pedunculo 0.6 c.M. longo; calyx glaber, tubo 0.1 c.M. longo, labio inferiore 0.05 c.M. longo, superiore 0.07 c.M. longo.

Sumatra: JACOBSON n. 2675, Indrapura, Tapan, 25 M. in alt., flrs. yellow. The affinity of this species is with V. *gamosepala*, V. *vestita* and V. *medusaecalyx*.

Imperfectly known or doubtful species:

41. **Vitex geniculata** BLANCO. Fl. Fil. ed. I, 514 (1837); Verb. 211.
Distribution: Philippines!

42. **Vitex? Koordersii** H. J. L., nov. spec.—*Folia* 5-foliolata; foliola omnia conformia, sed magnitudine varia, sessilia, cuneato-lanceolata, utrinque longe acuminata, latitudine majore supra medium, utrinque glaberrima, margine integra, nervis utrinque (7-) 12-16; lateralia $16^{1}/_{2}$ c.M. longa, 3-6 c.M. lata, terminalia $30\text{-}42^{1}/_{2}$ c.M. longa, $5^{1}/_{2}$-9 c.M. lata; petioli $17\text{-}21^{1}/_{2}$ c.M. longi, utrinque alati, cum alis glabris angustis 1.3-4 c.M. lati, prope basin paulo latiores quam prope apicem.

Sumatra: BUURMAN V. VREEDEN, Herb, var. bot. 158, Palembang; KOORDERS n. 10483 β, exp. YZERMAN, Central- Sumatra, Rawang, Sigati; 10 M. (?) or 5-6 M. (?) high, stem round, erect; native name: Pungung (m.) —Borneo: JAHERI, without nr. and locality.

43. **Vitex macrophylla** H. J. L. Verb. 212. (1919).
Distribution: New-Guinea!

44. **Vitex Merrillii** H. J. L. Verb. 212 (1919).—V. *euphlebia* MERR., ms. (?).
Distribution: Philippines (Mindanao)!

45. **Vitex ? padangensis** HALL. f., Med. 's Rijks Herb. Leid. n. 37, 46 (1918).
Distribution: W.-Sumatra!
According to the relatively large fruit, this might be a *Teysmanniodendron*,

Excluded species:

46. **Vitex bantamensis** KDS. et VAL. Bull. Inst. Btz. II, 12 and Bydr. Booms. Java n. 7, 210 (1910); Verb. 211 = *Vavaea bantamensis* (KDS. et VAL.) KDS. et MERR. (Meliaceae), Atl. d. Baumart., tab. 298.; KOORDERS, Verbess. und Einfüg. zu meine Exk. fl. v. Java (März 1914), 1.

15. GMELINA LINN. (Auctore BAKH.)

LINN. Gen. Plant. II (1742) p. 526; Linn. Flor. Zeyl. (1748) p. 103; Linn. Spec. Plant. II (1753) p. 626; Verb. 214.—MICHELIA AMMAN, Act. Petr. 8 (1739?) p. 218 (ex L- l. c.).

Distribution: Deccan Peninsula! Ceylon! Burma! Malacca! Malay Archipelago! Siam! Cochin-China! S-China! Philippines! New-Guinea! Australia!

1. a. Inflorescences axillary, 1- to few-flowered, calyx 1.5-2,5 c.M. long, with large deltoid segments, densely villous within . . . . . . 1. **G. uniflora**
b. Inflorescences terminal, paniculate, many-flowered; calyx 0.5-1 c.M. long, shortly toothed to nearly truncate, glabrous or with some hairs within . 2
2. a. Ovary densely hairy, especially towards the top; flowers with a shade of purple in the centre, sometimes bright-yellow or bright-blue 3

b. Ovary glabrous or nearly so; flowers yellow 4
3. a. Leaves more or less densely pubescent beneath; calyx 0.5-1 c.M. long, with some long hairs within . . . . 2. **G. moluccana**
b. Leaves glabrous beneath, or scarcely pubescent on the nerves only; calyx 0.3-0.5 c.M. long, glabrous within . . . . . . 3. **G. macrophylla**
4. a. Trees with terminal, erected inflorescences, and large leaves 5
b. Climbing shrubs with somewhat pendulous inflorescences an small leaves 7
5. a. Calyx glabrous; filaments distinctly hairy . . . 4. **G. palawensis**
b. Calyx densely pubescent, filaments glabrous or with some glanduliferous hairs 6
6. a. Leaves oblong or subobovate, truncate or cuneate at base, shortly acuminate at apex, glabrous or somewhat pubescent on the nerves beneath. 5. **G. Schlechteri**
b. Leaves broadly ovate, cordate at the base, abrubtly decurrent and acuminate at the apex, densely hairy beneath. . . . . . . 6. **G. arborea**
7. a. Corolla large, 4- lobed, ventricosely widened to the apex, 4-9- times as long as the calyx. . . . . 7. **G. asiatica**
b. Corolla small, 5- lobed, less than 4 times as long as the calyx. 8. **G. lepidota**

1. **Gmelina uniflora** in Hook. Icon Plant. XXIV (1895) pl. 2391;

A small tree; branchlets and petioles more or less yellow-hairy when young, glabrescent afterwards; leaves opposite, membranous or coriaceous, broad-elliptical or obovate, entire, base truncate or somewhat rounded, abruptly short-acuminate towards the petiole, apex obtuse or shortly acuminate, upper side subglabrous or with sparse simple hairs, except the villous nerves; lower side more or less hairy on the nerves with dense white minute glands, and two large hollow, or often little devellopped, glands at the base; pairs of nerves 3-7; 7-30 c.M. by 4-14 c.M.; petioles 1.5-6 c.M.; inflorescences solitary or two in the axils of the upper leaves, 1-3 flowered; flowers pendulous; pedicels short, 0.5-2 c.M., densely villous, with 2 large broad-ovate or 2 smaller lanceolate acute bracteoles; bracteoles 0.7-4 by 0.25-2 c.M. densely villous; calyx large, tubular for $^1/_3$-$^1/_2$, 5-lobed; segments large, unequal, acutely deltoid, often some of them connated to each other, in which case the calyx seems to be 3-4 lobed, 0.5-1 by 0.25-0.7 c.M.; outer and inner side densely and hirsutely hairy, 1.5-2.5 c.M. long, 0.5-1.2 c.M. wide, widened and at one side slit up, when in fruit; corolla large, unequally 5-lobed, 2-lipped, outer side softhairy, inner one, in the tube subglabrous, on the lobes densely farinose, both sides white-glandular, tube narrowed for $^1/_3$-$^2/_5$ from the base, ventricosely widened towards the top, $1^1/_2$-2 times as long as the calyx, 2.5-3.5 c.M. long; upper lip with 2 broad- ovate or semicircular lobes, lower lip 3- lobed, 2 of which are similar to those of the upper lip, 0.5-0.7 c.M. in diam., and 1 enlarged midlobe, 0.7-1 c.M. in diam; stamens 4, didynamous, subincluded, the shortest 1-1.2 c.M., the longest 1.5-1.7 c.M., anthers dorsifix above the middle or nearly at the top, 0.30-0.45 c.M. long; style slender, incurved, glandular-hairy towards the top, with subulate apex or obscurely and unequally twocleft stigma; ovary ovate, with stiff hairs at the top 4-celled, 4- ovuled; drupe mediocre oblong to obovate, juicy, densely farinose, especially towards the top, mature glabrescent, 2.5-3-5 by 1.5-2 c.M.

Distribution: Borneo.! (Banjermassing (after STAPF.)); Soengei Bloe-oe (JAHERI).

Var. α **typica** BAKH., nov. var.—*G. uniflora* STAPF (1895).—Folia adulta supra praeter costam glabra, nitida, subtus nervis sparse breviterque pilosa, cetera dense glandulis punctis minutis tecta, basi glandulis 2 majusculis cavis, nervis secundariis utrinque 3-4; 7-15 c.M. longa, 4-10 c.M. lata; petiolus 1.5-2.5 c.M. longus; inflorescentia axillaris, solitaria, uniflora, bracteolis 2 oppasitis, magnis vel mediocribus foliaceis, sessilibus, lato-ovatis, basi abtusis vel lato-rotundatis, saepe subcordatis, apice obtusis vel breviter acuminatis, concavis, calycem gerentibus vel involventibus, 8-10 nervis, 2-4 c.M. (1 c.M. ex STAPF.) longis, 15.-2 c.M. (0.5- c.M. ex STAPF.) latis; calyx 5-lanciniatus, 2-2.5 c.M. longus, 0.7-1.2 c.M. diam., laciniis 0.7-1 c.M. longis,0.5-0.7 c.M. latis, extus sparse glandulosus.

In Herb. Bog. from:

Borneo: Soengei Bloe-oe (JAHERI eyp. NIEUWENHUIS No. 526).

Var. β **villosa** BAKH., nov. var—Ramuli in sicco dense ferrugineo-tomentosi, adulti, praeter internodia glabri, dense resinoso-punctatis suffulti et sparse lenticellati; folia lato-elliptica vel obovata, integerrima, basi obtusa vel subrotundata, in petiolum brevissime attenuata, apice. obtusa vel rotundata, abrupte acuteque acuminata, membranacea vel subcoriacea, adulta supra subopaca praeter nervos dense pilosos, sparse, longe, simpliciter hirtella, subtus opaca, praecipue in nervis molliter pilosa, subvillosa, densissime glandulis punctis tecta, basi vix vel haud glandulosa, et glandulis parvis discoideis sparsis, nervis secundariis utrinque 4-7, basi subtrinervia, 10-30 c.M. longa, 7-14 c.M. lata; petiolus teres, obsolete sulcatus, dense ferrugineo-villosus, 1.5-6 c.M. longus; inflorescentia axillaris, solitaria vel geminata, brevi pedunculata, 1-3-flora; pedunculus 6.5-1 c.M. longus, dense rufo-tomentosus, bracteis bracteolisque foliaceis, subsessilibus, lanceolatis acutis, calycem suffultis utrinque rufo-tomentosis, 0.7-1.5 c.M. longis, 0.25-0.30 c.M. latis; calyx infundibuliformis, inaequaliter 5- laciniatus, 1.5-2 c.M. longus 0.5-1 c.M. diam., extus rufo-pubescens, et parce glandulosus, intus densissime villosus, laciniis deltoideis acutis, 0.5-1 c.M. longis, 0.25-0.30 c.M. latis, interdum inter sese adglutinosis; fructifer radialiter paulo auctus, unilateraliter usque ad basin incisus; corolla magna, inaequaliter 5- laciniata, extus basi glabra, superne dense pilosa, intus tubo glabra, laciniis dense farinosa, tubo basin versus pro $^1/_3$ parte attenuato, superne abrupte campanulato, subventricoso-ampliato, calyce 2-plo longiore, 2.5-3.5 c.M. longo, limbo subbilabiato, labio superiore, lobis 2 lato-ovato, apice obtuso-rotundato 0.5-0.7 c.M. diam., lobio inferiore, lobis 2 lateralibus iis labii superioris similibus, uno majore, 0.7-1 c.M. diam.; stamina didynamia, vix exserta, breviora 1-1.2 c.M., longiora 1.5-1.7 c.M. longa, basi lateraliter compressa, glabra, apice incurva, sparse glanduloso-hirsuta, antheris intriorsis bilocularibus, supra medium, prope apice dorsifixis, thecis basi longitudinaliter divergentibus, resinoso-punctatis, 0.30-0.35 c.M. longis; *ovarium* sessile, ovatum, apice dense villosum, glanduloso-punctatum, 4-loculare, loculis 1-ovulatis: *stylus* teres, filiformis, vix exsertus, apice incurvus, 2.5-3.5 c.M. longus, stigmate obscure inaequaliterque bifido, pseudo-subulato; *drupa* mediocris, oblonga vel obovata, baccata, apicem versus dense farinosa, deinde glabrescens, 2.5-3.5 c.M. longa, 1.5-2 c.M. diam., endocarpio crasso, lignoso.

Borneo: Soengei Bloe-oe (JAHERI exp. NIEUWÈNHUIS No. 1109, No. 1300 and No. 1463).

2. **Gmelina moluccana** (BL.) BACKER in HEYNE Nutt. Plant. Ned. Ind. IV (1917) p. 118;—*G. macrophylla* WALL. Cat. No. 1819 (1828) ex SCHAU. in DC. Prod. Syst. Nat XI (1847) p. 680;—*G. glandulosa* HALL. f. in Meded. 's Rijks Herb. Leid. No. 37 (1918) p. 57;—*Vitex moluccana* BL. Bijdr. Flor. Ned. Ind. 14e st. (1826) p. 813;—*Tittius* RUMPH. Herb. Amb. III (1750) p. 38 t. 20.

Arbor; ramuli crassi, novelli dense pubescentes, adulta glabrescentes, obscure quadrangulares, sparse lenticellatis; folia opposita, petiolata, magna, coriacea, lato-ovata vel obovato-subrotunda, basi obtusa vel rotundata, saepe leviter cordata, apice brevissime acuminata vel obtusa, integerrima, novella utrinque dense villosa, deinde supra praeter nervos nitida, subtus pallida, opaca, praecipue in nervis venisque glabra, molliter villosa, basi glandulis 2 majusculis excavatis supra bullatis, nervis secundariis utrinque 8-12, subtus prominentibus, reticulato-venosa, 15-40 c.M. longa, 7-35 c.M. lata; petiolus subteres, superne leviter sulcatus, novellus dense simplice pubescens, dein glabrescens, 1.5-10 c.M. longus, 0.2-0.5 c.M. diam.; inflorescentia terminalis, magna, pyramidata, basi foliosa, densissime breviter villosa, pedunculata, laxa, multiflora, 15-30 c.M. longa, 15-25 c.M. lata, cymulis multifloris in axillis bractearum mox deciduarum, bracteolis parvis, foliaceis, lanceolato-oblongis, utrinque acutis, 0.5-1 c.M. longis, 0.2-0.3 c.M. latis, mox deciduis; flores majusculi, subsessiles, nutantes; calyx cupuliformis, inaequaliter obtuseque 5-dentatus subbilabiatus vel subtruncatus, extus dense villosus, glandulis 2-4 parvis discoideis vestitus, intus sparse pubescens vel subglaber, utrinque resinoso-punctatis, 0.5-1 c.M. longus, 0.5-0.7 c.M. diam., fructifer vix auctus, corolla albescens fauce purpurascens, (fide RUMPHIUS), speciosa, inaequaliter 5-lobata, tubo inferne pro $^1/_3$-$^1/_2$ parte angustato in faucem ventricosam ampliato, calyce 2-2$^1/_2$-plo longiore, parte inferiore excepta, extus dense pubescens, inferne tubo glabrescens, lobis dense farinoso-pubescens, utrinque resinis punctis copiosis, 1.5—2 c.M. longo; subbilabiata, labio superiore lobis 2 lato-ovatis, obtuso-rotundatis, labio inferiore trilobato, lobis 2 lateribus iis labii superioris similibus, 0.5—1 c.M. longis, 0.4—0.6 c.M. latis, lobo mediano producto majore 0.7—1 c.M. longo, 0.35-0.58 c.M. lato; stamina 4, vix exserta, didynamia, 1-1.5 c.M. longa, filamentis teretibus, sparse breviterque pilis glanduliferis antheris glabris bilocularibus, supra medium dorsifixis, introrsis, 0.25-030 c.M. longis; ovarium sessile, ovato-oblongum, basi glabrum, apice dense pubescens, 4-loculatum, loculis 1-ovulatum; stylus teretiter filiformis, sparse pilis glanduliferis, vix exsertus, apicem versus incurvatus, 2.5-3 c.M. longus, stigmate inaequaliter bifido; drupa majuscula, oblonga vel subobovata, baccata, nova

farinosa, deinde glabrata, maturitate rubra [fide RUMPH.], apice depresso, 2.5-3 c.M. longa, 1.5-2 c.M. diam., endocarpio obovato, crasso-lignoso, apice subdeplanato, medio umbonato, margine 5.-toroso, abortu 1.-loculare, 1.-spermo.

Coll. Herb. Bog. from: Amboina (TEYSM. No. 1859 and 5031); Banda (TEYSM. No. 5158); Ceram (HEYNE No. 194).

Distributoin: Molucca-Isl.: Amboina! Banda! Ceram!

3. **Gmelina macrophyila** (R. BR,) BENTH. Flor. Austr. V (1870) p. 65.— *G. Dalrympleana* (F. V. MUELL.) H. J. L. Verb. Mal. Arch. (1919) p. 223.— *G. Ledermanni* H. J. L. Verb Mal. Arch. (1919) p. 226.— *Vitex macrophylla* R. BR. Prod. Flor. Nov. Holl. I (1810) p. 512.— *Vitex Dalrympleana* F. V. MUELL. Fragm. Phyt. Austr. (1863-1864) p. 128, and V (1865-1866) p. 72.— *Ephialis simplicifolia* SOLAND ex SEEM in Journ. Bot. III (1865) p. 258.— *Ephielis simplicifolia* SEEM. Flor. Vitiensis (1866) p. 189 (ex BENTH.).

In the description of the *Gmelina Dalrympleana* (F. V. MUELL.) H. J. L., Verb. 232, is to be changed „calyx-glabrous" into „calyx-dense pubescent afterwards glabrescent" and „ovary glabrous" into „ovary covered with stiff hairs" towards the top.

New-Guinea: Okaba [BRANDENHORST No. 23]; Kais. Wilh. Land. Land, [HOLLRUNG No. 657].

Distribution: Australia [R. BROWN.; BENTH.: F. V. MUELL.]! N-Guinea!

4. **Gmelina palawensis** H. J. L. Verb. Mal. Arch. (1919) p. 224.

This species is unknown te me. This species and the following one have a close resemblance with *G. macrophylla* R. Br. Benth. and perhaps they will appear to be identical with it. The only difference I found, was the glabrous ovary.

Distribution: Palao-isl.!

5. **Gmelina Schlechteri** H. J. L. Verb. Mal. Arch. (1919) p. 226.

I did not see any specimen of it. See above under *G. palawensis* H. J. L.

Distribution: New-Guinea!

6. **Gmelina arborea** ROXB. Plants Coast Corom. III (1819) p. 42 pl. 246;—*G. Rheedii* HOOK. Bot. Mag. (1848) t. 4395;—*Premna arborea* ROTH. Nov. Plant. Spec. (1821) p. 287;- *P. tomentosa* MIQ. (not of WILLD.) in Pl. Hohenack. No. 554 ex Clarke in HOOK. f. Flor. Brit. Ind. IV (1885) p. 581 sub *G. arborea*.— A tree, 6-20 M. high.; *panicles* terminal, erected, many-flowered. 3-15 c.M. long, cymules 3-, usually 1-flowered by reduction, bracts and bracteoles lanceolate, acuminate, densely villous on both sides, 0.3-1 by 0.10-0.25 c.M.; pedicels 0.15-0.30 c.M.; *calyx* shortly and acutely 5-toothed, 0.30-0.50 c.M., densely and appressed pubescent without and with 1-4 discoideal glands, glabrous inside; *corolla* large, yellow with brown, densely appressedly villous outside, with glanduliferous hairs inside, tube cylindrical for $^1/_3$ part (0.5-0.6 c.M), campanulately widened towards the top (1-1.2 c.M.), totally reaching a length of 1.5-1.7 c.M., 3-4-times as long as the calyx, limb twolipped, upperlip 2- lobed, lobes ovate and rounded, 0.7-1 by 1.2-1.5 c.M., lower lip 3-lobed, two of wich are uniform with those of the upperlip, but larger, 1.5 c.M. long, the four lobes brownish-yellow, the midlobe largest, broadly rounded, 1.5 by 2-2.5 c.M., yellow and ribbed on the upper, pale yellow on the lower side; *stamens*

exserted, didynamous, 1.3-1.5 c.M. and 1.7-2 c.M long, filaments glabrous, anthers, 0.25-0.30 c.M. long, ovary ovate, glabrous, *style* glabrous; *drupe* 2-3 cM. long 1.5-2 c,M. in diam.

Distribution: Ceylon! Deccan Peninsula! Himalaya! Burma! Malayan and Philippines Islands!

7. **Gmelina asiatica** L. Spec. Plant. II (1753) p. 626 (s.a.) — A large, climbing, or when adult sometimes treelike shrub, 1-10 M. high, usually spinous, especially when young, and on the young shoots; leaves opposite, ovate to obovate, entire or more or less 3-5 lobed, especially in youth and on young watershoots, glabrous or villous on both sides; inflorescences terminal, somewhat pendulous, few- or many-flowered, with leafy, small or very large bracts, cymules very short, 1-5-flowered; flowers large, pendulous; calyx small obscurely 4-toothed, 0.3-0.6 by 0.25-0,40 c.M., densely dark-brown hairy, with 2-more discoideal glands outside, glabrous inside; corolla large, yellow, unequally 4- lobed, scarcely and appressedly hairy outside, with dense glanduliferous hairs inside, tube for $^1/_3$-$^1/_2$-part cylindrically narrowed towards the base, abruptly and ventricosely widened towards the top, 4-9 times as long as the calyx, 2-5 c,M. long, limb 2- lipped, upper lip entire, curved, 0.3-1 by 0.7-1.2 c.M., lower lip 3- lobed, two of which are 0.7-1 by 1-1.2 c.M., the mid-lobe largest 1-2 by 1.2-1.7 c.M.; stamens 4, didynamous, included or hardly exserted, the shorter pair 0.5-1.5 c.M,, the longer one 1.5-2.5 c.M., filaments with dense glanduliferous hairs, anthers yellow but very soon dark, two of them less developped than the other ones or some of them sterile; ovary sessile, glabrous, 4- celled; style slender, hardly exserted, curved towards the top, 2.5-5 c.M. long, stigma unequally 2- cleft; *drupe* large, ovoid or obovoid yellow, when ripe, glabrous, 1.5-2-5 c.M. in diam.

Distribution: Brit.-India! Burma! Siam! Cochin-China! S.-China! Philippines and Malay-Archipelago!

Var. α **typica** BAKH., nov. var. — *G. asiatica* LINN. Spec. Plant II (1753) p. 626; — *G. coromandelica* BURM. Flor Ind. (1768) p. 132; — *G. lobata* GEÄRTN. Fruct. Sem. Plant I (1788) p. 268, tab. 56 fig. 5; — *G. parvifolia* ROXB. Plants Coast Corom. II (1798) p. 32 pl. 162: — *G. parviflora* [ROXB. ex PERS. Syn. Plant. II (1807) p. 142; — *Premna parvifolia* ROTH. Nov. Plant spec. (1821) p. 288; — *Arbuscula Bismagarica* PLUCKN. Phyt. I (1691) tab. 14 fig. 4 (ex Roxb.); — *Lycium maderaspatanum* PLUCKN. V. (1700) p. 234 t. 303 fig. 3 and t. 97 fig. 2 ex LINN. Flor Zeyl. (1748) p. 103 sub Gmelina and Spec. Plant II (1753) p. 626 sub G. asiatica.; — *Dematha zeylanensibus* HERM. Mus. Zeyl. (1717) p. 3.9.12.21. (ex BURM. and LINN.); — *Prunus indica sylvestris*, tructu flavo, pyriformi BURM, Thes. Zeyl. (1737) p. 197; — *Michelia spinosa* AMMAN Act. Petr. 8. (1739. ?) p. 218 t. 18;-LINN Flor. Zeyl. (1748) p. 103 sub Gmelina; LINN. Spec. Plant. II (1753) p. 626 sub. Gm. asiatica. — Fructex vel arbuscula, altitudine 1-5 M; ramuli spinosi; folia parva, brevi petiolata ovato-obovata, subrhomboidea integerrima vel sub-3-5-lobata, utrinque glabra vel glabrescentia, nervis secundariis utrinque 2-3, 1-5 c.M. longa, 0,5-3.5 c.M. lata; petiolus 0.3-2 c.M. inflorescentia

pauciflora, usque ad 7 c.M. longa, bracteis bracteolisque parvis, foliaceis, mox deciduis, ovato-lanceolatis, utrinque acuminatis, villosis, 0.3-2 c.M. longis, 0.2-0.7 c.M. latis; calyx parvus, 0.3-0.5 c.M. longus, extus tomentosus, glandulis magnis discoideis 2-4; corolla calyce 4-6-plo longior, 2-3.5 c.M. longa; *stamina* 0.5-1.2 c.M. longa; stylus breviter exsertus, 2.5-3.5 c.M. longus; *drupa* ovata, subglobosa, vel obovata, 1.5-2 c.M. diam.

Distribution: Mauritius! Deccan-penunsula! Ceylon! Burma! Malacca! Cochin-China! S-China! Philippines!

Var. β **villosa** (ROXB.) BAKH.—*Gmelina' asiatica* BURM. (not of L.) Flor. Ind. (1768) p. 132;—*G. villosa* ROXB. Hort Beng. (1814) p. 46; ROXB. Flor. Ind. III (1832) p. 86;—*G. elliptica* SMITH in REES. New Cyclop. (1836) vol. 16 (ex SCHAU.);—*G. inermis* BLANCO Flor. Filip. ed. I (1837) p. 493;—*G. integrifolia* HUNTER ex RIDL. in Journ. As. Soc. Straits 53 (1909) p. 101;—*Gmelina* spec. GRIFF. Not. Plant. As. IV (1854) p. 179;—*Radix deipara* RUMPH. and *Radix deiparae spuriae*, LOWARA RUMPH. Herb. Amb. II (1750) p. 124 tab. 39 and p. 127 tab. 40.— Frutex vel arbuscula, altitudine 2-10 M.; ramuli spinosi vel apicem versus inermes; folia parva vel mediocria, longiuscula petiolata, oblonga vel subrhomboidea, nova et in iis prope basi ramulorum 3-7-lobata, deinde et apicem versus integerrima, adulta supra glabrescentia, subtus foliis glabris novellis et iis basi turionum exceptis, dense et molliter villosa, nervis secundariis utrinque 3-5, 1-10.5 c.M. longa, 1-6.5 c.M. lata; petiolus 0.5-5 c.M.; inflorescentia pauci-vel multiflora, usque ad 10 c.M. longa, cymis 1-5-floris, bracteis bracteolispue parvis, foliaceis deciduis vel subpersistentibuS, lanceolato-oblonga, utrinque acuminatis, villosis, 1.5-2 c.M. longis, 0.15-1.2 c.M. latis; calyx parvus, 0.5-0.6 c.M. altus, extus tomentosus, glandulis magnis 1-6, discoideis; corolla calyce 4-6-plo longiora. 2-3.5 c.M. longa; stamina 1-1.2 c.M. et 2-3.5 c.M. longa; stylus vix exsertus, 2.5-3.5 c.M. longus; *drupa* ovata vel oblonga, 1.5-2 c.M. diam.

Distribution: Burma! Siam! Malacca! Nicobars! Pulu Pinang! Malay-Archipelago! Philippines! Indo-China!

Var. γ **philippinensis** (CHAM.) BAKH.—*Gmelina asiatica* LOUR (not of L.) Flor. Cochin, II (1790) p. 376;—*G. philippinensis* CHAM. in Linnaea VII (1832) p. 109;—*G. Hystrix* SCHULT. ex KURZ. in Journ. As. Soc. Beng. vol. XXXIX (1870) II p. 81; KURZ. For Flor. Brit. Burma II (1877) p. 265;—*G. Finlaysoniana* WALL. Cat. 6317 (1828) ex CLARKE in HOOK. f., Flor. Brit. Ind. IV (1885) p. 582;—*G. bracteata* BURCK. in Ann. Jard. Bot. Buitenz. X (1891) p. 98 t. 7 fig. 5-6.—Frutex vel arbuscula, altitudine 2-7 M.; ramuli, spinosi vel subinermes; folia mediocria, longiuscule petiolata, ovato-oblonga vel obovata, nova et ea prope basi ramulorum subrhomboideo-trilobata, deinde et epicem versus subintegerrima, adulta utrinque glabra, nervis secundariis utrinque 3-5, 1.5-10 c.M. longa, 1.5-6 c.M. lata, petiolus 0.5-4 c.M.; inflorescentia strobiliformis, dense multiflora, cymis abortu 1-floris, bracteis magnis, foliaceis, persistentibus, oblongis vet rotundo-ovatis, utrinque obtusis, concavis, cymis imbricato-amplectentibus, coloratis, sparse pilosis, nervis 5-10 parallelis, 2.5-4 c.M. longis, 2.5-3 c.M. latis; calyx parvus, 0.5-0.6 c,M. longus, extus tomontosus, glandulis magnis 2-4 discoideis; corolla calycem 6-9- plo longior, 3-5 c.M. longa; stamina

1.2-1.5 c.M. et 2-2.5 c.M. longa; stylus vix exsertus, 3.5-5 c.M. longus; drupa ovata vel obovata, 2-2.5 c.M. diam.

Siam: Bangkok (TEYSM. No. 5946; ZIMMERMAN No. 71);—Philippines: Luzon: (Barnes No. 362; FOXWORTHY No. 112; ELMER No. 8934);

Distribution: Siam! Tenasserim! Cochin-China! Philippines!

8. **Gmelina lepidota** SCHEFF. Plant. N-Guinée in Ann. Jard. Bot. I. (1876) p. 41;

N-Guinea: Poeloe Tow (TEYSM. No. 6744, Aug. 1871).

Excluded species:

9. **Gmelina indica** BURM. f. Flor Ind. (1768) p. 132, t. 39, f. 5)=Flacourtia indica (BURM. f.) MERR. Interpr. Rumph. Herb. Amb. (1917) p. 377

16. FARADAYA F. v. MUELL (Auctore H. J. L.)

Fragm. V. 21 (1865); Verb. 228.

Distribution: New-Guinea! tropical Australia!

1.	a.	Stamens distinctly didynamous	2
	b.	Stamens not distinctly didynamous	3
2.	a.	Flowers very large, calyx $2\frac{1}{2}$—$5\frac{1}{2}$ c.M. long, corolla-lobes 5 c.M. long, 2.-lobed down to the middle; stamens 14 c.M. long or more	1. **F. magniloba.**
	b.	Flowers smaller, calyx reaching $2\frac{1}{2}$ c.M., corolla-lobes $2\frac{1}{2}$ c.M. lower side of leaves with stellate scales	2. **F. squamata.**
3.	a.	Flowers very large, calyx $2\frac{1}{2}$—$5\frac{1}{2}$ c.M., corolla-lobes 5 c.M., 2-lobed down to the middle; stamens 14 c.M. long or more	1. **F. magniloba.**
	b.	Flowers smaller, calyx reaching $2\frac{1}{2}$ c.M., corolla-lobes $2\frac{1}{2}$ c.M.	4
4.	a.	Lower side of leaves with stellate scales	2. **F. squamata.**
	b.	Lower side of leaves without scales	5
5.	a.	Stamens inserted in the throat	6
	b.	Stamens inserted near the base of the corolla-tube	8
	c.	Stamens inserted in the middle of the corolla-tube	3. **F. splendida.**
6.	a.	Base of leaves 3-nerved; the lowest pair of nerves reaching the middle of the leaf; corolla-tube $\frac{1}{2}$—1 c.M.	4. **F. parviflora.**
	b.	Base of leaves not distinctly 3-nerved; the lowest pair of nerves not reaching the middle of the leaf; corolla-tube 1.5—1.7 c.M.	7
7.	a.	Leaves 12—15-nerved, without basal glands	5. **F. nervosa.**
	b.	Leaves 5—7-nerved, with basal glands.	6. **F. dimorpha.**
8.	a.	Filaments stout, glabrous at the base; leaves golden-yellowish tomentose beneath	7. **F. chrysoclada.**
	b.	Filaments slender, villous at base; leaves glabrous beneath.	8. **F. ternifolia**

1. **Faradaya magniloba** WERNH. in RIDL., Rep. o. t. Bot. Woll. Exp. in Transp. Linn. Soc. IX, 1, Bot. 2 Ser., 136 (1906); Verb. 229.

Distribution: Dutch New-Guinea!

2. **Faradaya squamata** H. J. L., Verb. 230 (1919).

Distribution: N.-E.-New-Guinea!

3. **Faradaya splendida** F. V. MUELL. Fragm. V, 21 (1885); Verb. 234—*F. papuana* SCHEFF. Ann. Jard. Bot. Btz. I, 42 (1876)—*F. Albertisi.* F. V. MUELL. Descr. not. pap. pl. VIII, 46. (1886); Verb. 230—*F. Matthewsii* VILLAMIL m. s. (?)—Usually climbing; *leaves* from ovate-elliptical,

both sides broadly cuneate, to ovate, base cordate, apex acuminate; pedicels 0.3-2.2 c.M.; *stamens* equal in length, always inserted in the middle of the corolla-tube; *fruit* 2-6$^1/_2$ c.M. long, 2-3 c.M. in diam.

In Herb. Bog. also from:

Borneo: VILLAMIL n. 253, Brit. N.-Borneo, flow. in Sept.-Oct. 1916 (*F. Matthewsii*).

New-Guinea: TEYSMANN. n. 6773, auth. spec. of *F. papuana*.-HOLLRUNG. n. 740—VERSTEEG n. 1075 (*F. Albertisii*).

Distribution: New-Guinea!, Queensland! N.-Borneo!

What we said about the stamens of *F. Albertisii* (Verb. 231) was a mistake They are always inserted in the middle of the corollatube. The type-specimen of *F. Albertisii* differs indeed from that of *F. splendida*. However, there are so much transition-forms between these two extremes, that we certainly are justified to combine the two species.

4. **Faradaya parviflora** WARB., Engl. Jhrb. XVIII, 208 (1894); Verb. 231.

VAR. α **typica** H. J. L., Verb. 232; New-Guinea!

VAR. β **angustifolia** H. J. L. Verb. 232; New-Guinea!

Distribution of the species: New-Guinea!

5. **Faradaya nervosa** H. J. L., Verb. 232 (1919).

Distribution: New- Guinea!

6. **Faradaya dimorpha** PULLE in LORENTZ, Nova Guinea VIII, 4, 686 (1912); Verb. 233—*Leaves* 9-20 c.M. long, 2$^1/_2$-11$^1/_2$ c M. broad; petioles 0.4-3.6 c.M.

We discovered (in specimens, cultivated in the Botanical Gardens of Buitenzorg), that opposite and ternate leaves occur on the same plant. There is, therefore, no reason for making 2 varieties.

7. **Faradaya chrysoclada** K. Schum. in K. SCHUM. v. LAUTERB, Fl. D. Südsee, Nachtr. 370 (1905); Verb. 234.

Distribution: New- Guinea (Astralabe Range)!

8. **Faradaya ternifolia** F. V. MUELL., Descr. not. pap. pl., VIII, 46 (1883); Verb 236,

Distribution: S.- New- Guinea!

17. HOSEA Ridl. (Auctore H. J. L.)

Journ. As. Soc. Straits 50, 124 (1908); Verb. 236.

Distribution: W.-Borneo (also Penang?)!

1. **Hosea Lobbii** RIDL. l. c. 125; Verb. 237.—*Clerodendron Lobbii* CLARKE in HOOK f. Fl. Br. Ind. IV, 590 (1885)- *Leavss* ovate-rotundate, base rounded or subcordate, apex obtuse or broadly cuneate; cymes dichotomous, with 2×6-10 flowers; pedicels 0.2-1.2 c.M.; calyx-lobes 0.5-0.6 c M. long, 2-toothed, teeth 0.25-0.3 c.M.; corolla-tube narrowly infundibuliform, 0.5 c M.; limb deeply 2-lipped, upper lip entire, 0.7 by o.4 c.M., lower one 3-lobed, 0.6 c M, the lobes rounded 0.2 c.M.; *siamens* inserted near the base of the corolla-tube, 2.6 c.M. long; *style* 2.8 c.M. long; *ovary* glabrous.

Description, somewhat different from that, given on p. 237 of the „Verb." after the specimen in Herb. Bog.:

Borneo: G. D. H. (aviland [1]) (Smiles) p. 359, Sarawak.

Distribution: W.-Borneo (also Penang?)

See also the annotation at Verb. 238.

18. CLERODENDRON LINN. (Auctore BAKH.)

Clerodendrum LINN. Gen. Plant. Ed. I (1737) p. 186; LINN. Gen. Plant. Ed. II (1742) p. 290; Verb. 238-320.—*Volkameria* LINN. Gen. Plant. Ed. I (1737) p. 347; LINN. Gen. Plant. Ed. II (1742) p. 305.—*Clerodendron* BURM. Thes. Zeyl. (1737) p. 66 tab. 29.—*Duglassia* HOUST. Acta ante acta Mss. ex LINN. Gen Plant. (1737) p. 347 sub. Volkameria—*Ligustroides* Houst. ex Linn. Hort. Cliff. (1737) p. 489.—*Siphonanthemum* AMM. Act. Ac. Petrop. (1741) p. 213-215 (ex LINN.).—*Ovieda* LINN. Gen. Plant. Ed. II (1742) p. 195.—*Siphonanthus* LINN. Gen. Plant. Ed. II (1742) p. 526.—*Valdia* PLUM. ex ADANS. Fam. II (1763) p. 157.—*Douglassia* ADANS. Fam. II (1763) p. 200.—*Duglassia* HOUST. Reliq. (1781) 13.—*Montalbania* NECK. Elem. I (1790) p. 273.—*Volkmannia* JACQ. Hort. Schoenbr. III (1798) p. 48 t. 338.—*Agricolaea* SCHRANK. in Denkschr. Akad. Wiss. Muench. (1808) p. 98.—*Torreya* SPRENG. Neue Entdeck. II (1821) p. 221.—*Egena* RAFIN. Flor. Tellur. II (1836) p. 85.—*Rotheca* RAFIN. Flor. Tellur. IV [1836] p. 69.—*Cornacchinia* SAVI in Mem. Soc. Ital. Mod. XXI [1837] p. 184 t. 7.—*Cyclonema* HOCHST. in Flora XXV [1842] p. 225.—*Spironema* HOCHST. in Flora XXV [1842] p. 226.—*Cyrtostemma* KUNZE in Bot. Zeit. I [1843] p. 272.—*Tetrathyranthus* A. GRAY in Proc. Amer Acad. VI [1862-1863] p. 50.

Distribution: In tropical and subtropical regions of the whole world.

1. a. Calyx very shortly toothed or subtruncate, cup-shaped in fruit, never reflexed, when mature always smaller than the fruit 2
   b. Calyx distinctly lobed, usually up to the middle or lower, when stellately spreading or reflexed when mature often torn up, as large as, or larger (rarely smaller) than the fruit. 8
2. a. Leaves ovate or oblong, base obtuse or abruptly short-acutely acuminate. . 3
   b. Leaves obovate, base acutely attenuate 6
3. a. Cymes in the axils of normal leaves, forming a leafed inflorescence; straggling or climbing shrubs . . . . **1. C. inerme**
   b. Cymes in the axils of bracts, forming a leafless panicle. Erected shrubs or small trees. 4
4. a. Panicles dense umbelliform, many-flowered; corolla-tube 1-1.7 c.M. long; calyx 0.20-0.35 c.M. long . . . . **2. C. Sahelangii**
   b. Panicles lax. Corolla-tube more than 2.5 c.M. long; calyx more than 0.35 c.M. long 5
5. a. Calyx and corolla hairy outside; corolla ± 3 c.M. long **3. C. mindoroense**
   b. Calyx and corolla glabrous outside; corolla ± 6 c.M. long **4. C. Klemmei**
6. a. Corolla-lobes equal and conform, regularly spreading; leaves entire; panicles lax . . . . **5. C. amicorum**
   b. Corolla-lobes unequal, obliquely spreading; leaves distantly serrate-denticulate towards the top; panicles dense 7

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[1] Note of the author.

7. a. Corolla light-blue; tube wide- cylindrical, $1\frac{1}{2}$-2 times as long as the calyx, 0.5-0.9 c.M. long; panicles elongated; leaves glabrous on both sides, except on the nerves . . . . **6. C. serratum**

b. Corolla white or pale-yellow; tube slender, very much elongated, many times as long as the calyx, 7-11 c.M. long; panicles short, umbelliform; leaves densely hairy on both sides . . . . **7. C. Incisum**

8. a. Well develloped leaves with the largest breadth at or above the middle, the base-nerves not stronger than the higher ones; base of leaves acuminate or cuneate, rarely subcordate 9

b. Well develloped leaves with the largest breadth below the middle; base-nerves much stronger than the higher ones (subpalmi-nerved); base of leaves obtuse, rounded or cordate 28

9. a. Corolla dark-red, or crimson, climbing shrubs 10

b. Corolla white or light-yellow, rarely from flesh- to orange-coloured; erect shrubs, or small trees 11

10. a. Corolla-tube 3 or more times as long as the calyx, almost glabrous outside; calyx small, red, 0.5 c.M. long or smaller . . . . . **8. C. splendens**

b. Corolla-tube less than twice as long as the calyx, softly pubescent outside; calyx large, white, rarely purple, 1.5-2.5 c.M. long . . **9. C. Thomsonae**

11. a. Corolla-tube not longer than 5 c.M. usually less than 4.5 c.M. 12

b. Corolla-tube more than 5 c.M. long, rarely less than 6 c.M. 22

12. a. Corolla glabrous outside . . . . **10. C. laevifolium**

b. Corolla with dense glanduliferous hairs outside. 13

13. a. Leaves glabrous on both sides; corolla-lobes unequal; obliquely spreading . 14

b. Leaves pubescent on both surfaces, or at least on the lower one; corolla-lobes equal and conform, sub-radially spread 15

14. a. Inflorescences pendulous, racemose; calyx large and inflated, glabrous outside corolla-tube 1-1.5 c.M. long, less than twice as long as the calyx **11. C. nutans**

b. Inflorescences erect, wide-paniculate; calyx small, hairy outside; corolla-tube 2-3 c.M. long, 2-4 times, as long as the calyx **12. C. macrophyllum**

15. a. Inflorescences pendulous, umbelliform or sub-capitate, densely and many-flowered; corolla flesh-coloured . . . . **13. C. deflexum**

b. Inflorescences erect, laxely paniculaeformous, leafed or not so 16

16. a. Calyx with the segments narrow, linear or subulate; calyx lobed always almost down to the base 17

b. Calyx with the segments broadly ovate or oblong, acute or obtuse; calyx lobed for $\frac{1}{2}$-$\frac{2}{3}$ down, rarely *(in C. fortunatum L.)* nearly down to the base 19

17. a. Leaves almost quite irregularly crenate-serrate, base abruptly and shortly acute-attenaute, apex obtuse; surface rugose; corolla-tube glubrous inside . . . . **14. C. calamitosum**

b. Leaves wholly entire or irregularly and distantly serrate above the middle towards the top; base cuneate, rounded or cordate; apex shortly acuminate; corolla-tube hairy inside 18

18. a. Small shrubs, usually less than 1 M. high., sometimes reaching $1\frac{1}{2}$ M.; stem fistular and (always?) inhabited by ants. Leaves elliptic or elliptic-obovate, broadly rounded or cordate at the base; margins entire or undulate-denticulate; panicles thyrsoid; flowers bright-yellow, tingel with red . . . . **15. C. breviflorum**

b. Shrubs 1—3 M. high.; stems not fistular; leaves oblong or obovate, cuneate, obtuse or rounded at the base; margins irregularly distantly serrate above the middle towards the top, rarely subentire: flowers white or pale-yellow. . . . . **16. C. disparifolium.**

19 a. Calyx campanulato-inflate, glabrous or sparsely hairy outside; margins of leaf irregularly toothed, rarely subentire 20

b. Calyx infundibuliform, densely puberulous outside; margin of leaf entire, rarely dentate 21

20.a. Panicles terminal, leafed below; calyx glabrous outside, five-cleft for the half; corolla-tube 2—3 times as long as the calyx.—Leaves ovate or ovate-rhomboid, irregularly and bluntly serrate, except at the base and at the top . . . . **17. C. multiflorum.**

b. Panicles leafed, composed of axillary cymes; calyx sparsely hairy outside, cleft almost down to the base; corolla-tube about as long as the calyx; leaves oblong-lanceolate, elliptic or subobovate, irregularly toothed or subentire. . . . . **18. C. fortunatum.**

21 a. Inflorescences terminal, sometimes leafless, except at the base; corolla-tube 1.5—2.5 c.M. long; leaves with obtuse or rounded, sometimes subcordate base . . . . **19. C. porphyrocalyx.**

b. Inflorescences composed of cymes in the axils of normal leaves; corolla-tube 4-5 c.M. long; leaves with acute-attenuate base . . **20. C. ingratum.**

22 a. Cymes in the axils of normal leaves, 1-5-flowered; leaves in whorles of 3-5, rarely opposite, 10-more times as long as broad. . . **21. C. indicum.**

b. Inflorescences terminal, leafless; leaves always opposite, less than 7 times as long as broad 23

23 a. Calyx cleft down to the base, lobes narrowly lanceolate 24

b. Calyx lobed not more than for $^{2}/_{3}$ down; segments ovate or deltoid . . 25

24. a. Calyx and corolla glabrous outside; leaves densely glandular-punctulate below; undershrubs of ± 1 M. high, with hollow club-shaped internodes, which are provided with two opposite round holes at the top **22. C. fistulosum**

b. Calyx and corolla pubescent outside; leaves not or scarcely glandular-punctulate below; shrubs or small trees, ± 5 M. high, also often with inflated internodes, but without holes . . . . **23. C. Ridleyi**

25. a. Corolla glabrous outside; branchlets without distinct lenticels . . . . **24. C. longiflorum**

b. Corolla puberulous outside; branchlets with distinct light-coloured lenticels 26

26. a. Calyx densely puberulous outside. . . . . . **25. C. quadriloculare**

b. Calyx glabrous outside 27

27. a. Calyx tubular, inflated, 2-3.5 c.M. long; leaves glabrous on both sides . . . . **26. C. minahassae**

b. Calyx campanulate, 1-1.5 c.M. long; leaves puberulous on both sides . . . . **27. C. capitatum**

28. a. Corolla-tube 10-12 c.M. long; calyx glabrous outside **28. C. hastatum**

b. Corolla-tube less than 10 c.M. long; calyx hairy outside 29

29. a. Inflorescences leafed, composed of cymes in the axils of normal leaves . 30

b. Inflorescences terminal; cymes, often the lower ones excepted, in the axils of less develloped or bracteal leaves 32

30. a. Corolla globrous outside; calyx very small, smaller than the fruit, when fruiting . . . . **29. C. Colebrokianum**

b. Corolla hairy outside; calyx rather large, as large as, or larger than the fruit, when fruiting 31

31. a. Cymes capitate, dense, many-flowered, with large, foliaceous and persistent bracts; leaves densely villous on both sides, margins entire **30. C. bracteatum**

b. Cymes lax, rather few-flowered, with small, deciduous bracts. Leaves very sparsely hairy on both sides, or glabrous except the nerves, margins distantly serrate-dentate, or (in the leaves below) 3-lobed . **31. C. trichotomum**

32. a. Inflorescences dense, globose, or composed of capitate cymes; bracts usually large or foliaceous, subpersistent; corolla-lobes regularly spreading . . 33

b. Inflorescences elongated, paniculaeform; bracts small and caducous; corolla more or less oblique 35

33. a. Corolla densely villous outside . . . . **32. C. macrostegium**
b. Corolla glabrous outside 34

34. a. Corolla-tube 2-3 c.M. long; calyx 1.5-2.5 c.M. long, with many large peltate glands outside; leaves with irregularly crenate-serrate margins, rarely sub-entire. . . . . **33. C. fragrans**
b. Corolla-tube 4-6 c.M. long; calyx 1-1.2 c.M. long, without peltate glands outside; leaves entire . . . . **34. C. Cunninghamii**

35. a. Corolla-tube distinctly and densely hairy outside, usually with long hairs . 36
b. Corolla-tube glabrous outside, or minutely, inconspicuously pubescent . . 42

36. a. Calyx and corolla long-hairy inside; corolla-tube usually less than 1½ times as long as the calyx, rarely longer 37
b. Calyx and corolla shortly hairy or glabrous inside; corolla-tube more than 1½ times as long as the calyx 39

37. a. Calyx deeply cleft down the middle, greenish . . . . . **35. C. villosum**
b. Calyx cleft down not as far as the middle, red. 38

38. a. Calyx less than 1 c.M. long, shortly and appressedly hairy outside, except on the almost glabrous lobes; teeth short-deltoid; corolla small; tube 0.5-1 c.M. long; leaves entire . . . . . **36 C. brachyanthum.**
b. Calyx 1—1.5 c.M. long, densely long-hairy outside; lobes lanceolate; corolla large; tube 1—2 c.M. long. Leaves distantly serrate-dentate, rarely almost entire . . . . **37. C. lanuginosum.**

39. a. Calyx cleft down past the middle, usually almost down to the base; lobes broadly ovate, sparsely strigose-hairy and with many large glands outside. . . . . **38. C. viscosum.**
b. Calyx not cleft down as far as the middle; lobes oblong-lanceolate, densely hairy and without obvious glands outside 40

40. a. Calyx shallowly incised, 2—2.5 c.M. long; leaves distantly serrate-dentate. . . . . **39. C. Preslii.**
b. Calyx less than 1.5 c.M. long; leaves entire 41

41. a. Corolla-tube less than twice as long as the calyx; calyx long hairy outside. . . . . **40. C. Cumingianum.**
b. Corolla-tube more than twice as long as the calyx; calyx shortly hairy outside. . . . . **41. C. buruanum.**

42. a. Calyx not or scarcely incised as far as the middle; corolla white with pink in the throat . . . . **42. C. infortunatum.**
b. Calyx slit down past the middle; corolla orange-coloured or red 43

43. a. Leaves densely hairy below, with or without some spread scales 44
b. Leaves glabrous below, except on the nerves, densely glandular punctulate or covered with peltate scales 45

44. a. Calyx 0.3—0.5 c.M. long, with narrow, lanceolate, erect or appressed lobes; corolla-tube 5—6 times as long as the calyx; lobes 0.7—1 by 0.4—0.5 c.M.; buds when grown-up 0.3—0.5 c.M. in diam; stamens twice as long as the corolla-lobes, 2—2.5 c.M. long: style 3—4 c.M. long. . **43. C. Buchanani**
b. Calyx 0.7—1.2 c.M. long, with ovate or deltoid, patent lobes: corolla-tube 3—4 times as long as the calyx: lobes 1—2.5 by 0.1—1 c.M.: buds when grown-up 0.7—1.2 c.M. in diam.: stamens 3 times as long as the corolla-lobes, 4—6 c.M. long: style 6—7 c.M. long. . . . . . **44. C. speciosissimum.**

45. a. Calyx and corolla more or less pubescent outside; leaves densely scaled below, rarely with minute glands 46
b. Calyx and corolla glabrous outside. Leaves densely punctulate below . . 47

46. a. Normal leaves 3-7-lobed, sometimes with the exception of the highest ones; lobes entire; calyx 0.2-0.5 c.M. long; lobes ovate, subobtuse, 0.15-0.20 c.M. long; corolla orange-coloured, rarely red (?); tube 4-6 times as long as the calyx . . . . **45. C. paniculata**

b. Normal leaves not lobed, serrate-dentate, rarely sub-entire. Calyx 0.5-1.5 c.M. long; lobes oblong or elliptical, acute, more than 0.4 c.M. long; corolla dark-red; tube less than 4 times as long as the calyx. . 46. **C. squamatum**

47. a. Leaves cordate-rotundate; calyx 1.8-2.5 c.M. long, 3-partite; corolla-tube 2.5-3.3 c.M. long; lobes 2-2.5 c.M. long; stamens 3-4 c.M. long . 47. **C. Hettae**

b. Leaves broadly ovate, base cuneate or subtruncate; calyx 1.3-1.7 c.M. long, (5-)3-(2)- partite; corolla-tube 1.4-2 c.M. long; lobes 1-1.5 c.M. long; stamens 7-9 c.M. long . . . . 48. **C. magnificum**

1. **Clerodendron inerme** (L.) GAERTN. Fruct. et Sem. Plant. I (1788) p. 271. t. 75; R. BR. Prod. Flor. Nov. Holl. I. (1810) p. 511.— *C. coriaceum* POIR. in LAM. Enc. Méth. Bot. Suppl. IV (1816) p. 353.— *C. Commersonii* POIR.) SPRENG. Syst. Veg. II (1825) p. 758.— *C. buxifolium* (WILLD.) SPRENG. Syst. Veg. II (1825) p. 758.— *C. javanicum* SPRENG. Syst. Veg. II (1825) p. 759.— *C. capsulare* BLANCO Flor. Filip. (1837) p. 509.— *C. nereifolium* WALL. Cat. 1789 (1829) ex WALP. Rep. Bot. Syst. IV (1844-1848) p. 110.— *Volkameria inermis* LINN. Flor. Zeyl. (1748) p. 104; LINN. Spec. Plant. II (1753) p. 889.— V. *Commersonii* POIR. in LAM. Encl. Méth. VIII (1808) p. 688.—*C. buxifolia* WILLD. Enum. Plant. (1809) p. 658.— *V. nereifolia* ROXB. Flor. Ind. III (1832) p. 64.— *Nir Notsjil* RHEEDE Hort. Mal. V (1685) p. 97. t. 49.— *Niir Notsjil* RAJUS Hist. Plant. II (1693) p. 1573.— *Jasminum litoreum* RUMPH. Herb. Amb. V (1750-1755) p. 86. t. 46.

Distribution: Along the sea coast of: Brit.-India! from Bombay! Ceylon! Bengal! to Burma! and Malacca!-Siam! Cochin-China! Malay Archipelago! Australia! Polynesia! Philippines! China!

2. **Clerodendron Sahelangii** KOORD. mss.; — *Clerodendron* spec. indet. KOORD. Bot. Dienstreis Minahassa in Med. 's Lands Plant. XIX (1898) p. 559. — Arbuscula 2-7 M. alta; ramuli obscure quadrangulares, glabri, sparse distincto-lenticellati, dense-minutissime punctati, basi ramulorum et foliorum pulvino distincto instructi; folia opposita vel ternata, petiolata, membranacea vel subcoriacea, elliptico-oblonga vel subobovata, basi obtuso-cuneata vel rotundata, raro subcordata apice abrupte breviterque acuminata vel subobtusa, integerrima, utrinque glaberrima, supra atro-viridia, nitida, subtus pallidiora, sparse glandulis peltatis vessita, nervis secundariis utrinque 5-8, subtus prominentibus, 7-25 c.M. longa, 5-12 c.M. lata; petiolus subteres, superne leviter sulcatus, novus glanduloso-pilosus, deinde glabrescens, 1-10 c.M. longus, 0.2-0.5 c.M. diam.; inflorescentia terminalis, umbellato-paniculata, dense breviterque purpurascenter pilosa, pedunculata, ± multiflora, 5-20 cM. longa, 5-15 c.M. lata, cymis multifloris pedunculo 1.5-7 c.M. longo bracteis parvis lanceolatis dense purpurascenter pilosis; flores minusculi erecti purpurascentes pedicellis, 0.15-0.3 c.M. longis, paullo suaveolentes; calyx atro-purpureus vel purpurascens, campanulatus, brevissime 5-denticulatus, extus sparse pilosus, resinoso-punctatis, intus glaber, 0.20-0.35 c.M. altus, 0.20-0.25 c.M. diam., fructifer auctus; *corolla* albida apice laciniarum purpurascens, regulariter 5-laciniata, tubo angusto, calyce 3-5-plo longiore, extus praeter basin sparse farinoso vel glabrescente, intus minute piloso, 1-1.7 c.M.

longa, laciniis subrotundatis, ovatis vel subobovatis, extus dense puberulis, intus glabris, 0.3-0.7 c.M. longis, 0.25-0.50 c.M. latis; *stamina* longe exserta, corollae laciniis $2^1/_2$-3-plo longiora, 0.12-0.20 c.M. longa, filamentis albis teretibus, glabris, antheris flavis vel flavo-purpurascentibus, oblongis, 0.15-0.20 c.M. longis; *ovarium* globosum vel subobovatum, glabrum, obscure 4-lobatum; *stylus* atropurpureus, teres filiformis glaber, longe exsertus, stigmate aequaliter bipartito; *drupa* baccata, globosa, glabra 1 c.M. diam., calyce cupuliforme suffulta, 2-3-plo aucto fructum infra medium amplectente.

Coll. Herb. Bog.: Celebes, Minahassa (VORDERMAN No. 34; KOORD. No. 19503-Ratahan- March 14 th. 1895; KOORD. No. 19520- idem-March 26 th, 1895); Kei- Isl.: (JAHERI No 197).

Distribution: Celebes! and Moluccas!-N-Guinea! (?) Philippines!

Probably this is the C. elliptifolium Merr. Phil Journ. Sc. Bot. VII (1912) p. 341, but I cannot decide in consequence of the absence of any materials.

3. **Clerodendron mindoroense** MERR. Phil. Journ. Sc. Bot. VII (1912) p. 342—*C. simile* (not of PEARSON) MERR. in Gov. Lab. Bull. No. 35 (1906).

Distribution: Philippines!

Coll. Herb. Bog.: Luzon (ELMER No. 15494).

4. **Clerodendron Klemmei** ELM. Leafl. Phil. Bot II (1908) p. 54.

Coll. Herb. Bog.: Luzon (ELMER No. 8679).

Distribution: Philippines!

5. **Clerodendron amicorum** SEEM. in Bonplandia X (1862) p. 249— A shrub, ± 5 M. high, branchlets round, densely and appressedly tomentose, afterwards glabrescent; *leaves* opposite, obovate, base attenuately acuminate, spex abruptly and shortly acuminate; margins entire; coriaceous; pairs of nerves 5-8; glabrous on both surfaces; 7-20 by 3.5-9 c.M.; *petioles* 1-3 c.M.; panicles lax, often corymbose, composed of axyllary, trichotomous cymes; peduncles 3-5 c.M. long; pedicels 0.2-0 3 c.M.; *calyx* campanulate, shallowly. more or less distinctly toothed or subtruncate; teeth broadly ovate and obtuse, densely pubescent and with some large glands outside, glabrous inside, 0.4-0.6 c.M. long, 0.6-0.8 c.M. c.M. in diam., teeth broadly-ovate, obtuse; *corolla* white, pubescent outside, especially towards the top, glandular; tube subhypocraterimorphous, atmost glabrous towards the base, pubescent towards the top, 1.5-2 c.M. long, lobes ovate, obtuse or rotundate, densely villous on both sides, 0.3-0.5 c.M.; *stamens* shortly exserted, 1.5-2 c.M. long; *style* glabrous, 2-2.5 c.M. long; *ovary* distinctly 4-lobed.

Distribution: Pacific Isl!

Coll. Herb. Bog: Samoa (REINECKE No. 173).

6. **Clerodendron serratum** (L.) SPRENG. Syst. Veg. II (1825) p. 758—*C. grandifolium* SALISB. Prod. Stirp. (1796) p, 108; -*C. divaricatum* JACK in Mal. Misc. (1820) I. n. 2; W. J. HOOKER in Bot. Misc. II (1831) p. 89; W. JACK. Discr. Mal. Plants. in Calc. Journ. Nat. Hist. (1843) p. 40—*C. ternifolium* D. DON. Prod. Flor. Nepal (1825) p. 103.—*C. macrophyllum* SIMS. Bot. Mag. vol. 52 (1825) t. 2536.— ? *C. spicatum* THUNB. Flor. Java (1825) p. 22.—

C. trifoliatum STEUD. Nom. Bot. Ed. 2. I. (1840) p. 383—*C. farinosum* (ROXB.) WALP. Rep. Bot. Syst. IV (1844-1848) p. 107—*C. obovatum* (ROXB.) WALP. Rep. Bot. Syst. IV (1844-1848) p. 112—*C. javanicum* WALP. Rep. Bot. Syst. IV (1844-1848) p. 113—*C. javense* WALL. Rep. Bot. Syst. IV (1844-1848) p. 332 Index cub. C. javanicum.—*C. herbaceum* WALL. Cat. 1815 (1828) ex SCHAU. in DC. Prod. Syst. Nat. XI (1847) p. 675—*C. cuneatum* TURCZ. in Bull. Soc. Imp. Nat. Mosc. (1863) II p. 221—*C. ornatum* WALL. Cat. 1811 (1828) ex KURZ. For. Flor. II (1877) p. 267 sub. C. serratum. Spreng. var. ornatum (WALL.) Kurz.—*C. farinosum* WALL. Cat. 1810 (1828) ex STEUD. Nom. Bot. Ed. 2-I (1840) p. 382; CLARKE in HOOK. f. Flor Brit. Ind. IV (1885) p. 592 sub. C. serratum Spr. var Wallichii Clarke.—*C. venosum* WALL. Cat. 1807 (1828) ex CLARKE in HOOK. f. Flor. Brit. Ind. IV (1885) p. 592.— *Volkameria serrata* LINN. Mant. Plant, (1767) p. 90.—*V. obovata* ROXB. Flor. Ind. III (1832) p. 62.—*V. farinosa* ROXB. Flor. Ind. III (1832) p. 64; Cat. Hort. Beng. (1795) p. 46.—*V. herbacea* ROXB. Cat. Hort. Beng. (1795) p. 46, ex STEUD. Nom. Bot. Ed. II 1840) p. 383. sub. C. herbaceum, ex CLARKE in HOOK. f. Flor. Brit. Ind. IV (1885) p. 592 sub. C. serratum — *Caprifolium ovatum* NORONH. nom. nud. in Verh. Bat. Gen. V. (1790) p. 71, ex HASSK. Plant. Jav. Rar. (1848) p. 489 sub. Cyclonema serratum.— *Rotheca bicolor* RAFIN, and *Rotheca ternifolia* RAFIN. Flor Tellur IV (1836) p. 69. —*Cyclonema serratum* (L.) HASSK. Plant. Jav. Rar. (1848) p. 489.— *Tsjéru Téka* RHEEDE Hort. Mal. IV (1683) p. 61. tab. 29. —*Tsjerou Theka* RAJUS Hist. Plant. II (1693) p. 1501. —*Téka crispa* COMMELIN Flor. Mal. (1696) p. 66.

Distribution: East—Africa: Madagascar! Mauritius! Seychelles!— Asia: India! from Bombay! and the Himalaya! to Ceylon! Burma! and Malacca! Malay-Archipelago: Sumatra! Java! Lombok! Flores! Celebes!

7. **Clerodendron incisum** KLOTZSCH in PETERS Reise Mossamb. Bot I (1862) p. 257. —*C. Lindemuthianum* VATKE Plant. It. Afr. Hildebr. in Linnaea (1880-1882) p. 507 —*C. macrosiphon* HOOK. f. Bot. Mag. 39 (1883) tab. 6695 — Erect shrub, 1-2 M. high; branchlets tetragonous, minutely pubescent or subglabrous; LEAVES opposite or ternate, lanceolate-oblong or subobovate, narrowed at both ends, coarsely serrate-dentate or shallowly sinuate, above the middle subcoriaceous, finally pubescent on both sides, especially on the nerves; 7-12 c.M. by 2.5-5 c.M.; PETIOLES 0.5-1.5 c.M. long; INFLORESCENCES terminal, subsessile, umbelliform, many-flowered, 1.25 c.M. without the flowers; bracts lanceolate, longer than the calyx; CALYX funnel-shaped, 0.4-0.5 c.M., unequally toothed, teeth small-deltoid; COROLLA white or yellowish-white; tube slender, very much elongated, 6-11.5 c.M. long, limb inflate, oblique; lobes oblong, short; *stamens* slender, exsert, 5 c.M. long, filaments red.

Distribution: East-Africa!

Var. *α* **typica** BAKH, nov. var. — *C. incisum* KLOTZSCH.—*C. Lindemuthianum* VATKE — *calyx* and *corolla*-tube glabrous outside; corolla-tube 6-7.5 c.M. long; *leaves* 7.5-12 by 3-5 c.M.

Var. β **macrosiphon** (HOOK. f.) BAKER — *C. macrosiphon* HOOK. f. —*Calyx* and *corolla*-tube pubescent outside; corolla-tube 7-11.5 c.M. long, *leaves* 3-10 by 1-2.5 cM.; ovary oblong, glabrous; style slender, long exsert, 12-15 c.M. long, red; *stigma* equally 2-lobed; *drupe* glabrous 0.7-1 c.M. long, dark-purple, when mature, much larger than the calyx.

In Indonesia often cultivated.

8. **Clerodendron splendens** G. DON. in JAMES Edinb. Phil Journ. XI (1824) p. 349; Bot. Mag (1842) p. 103; LNDL. Bot. Reg. XV (1839) t. 7 — *C. aurantium* G. DON. in JAMES Edinb. Phil. Journ. XI (1824) p. 349 — *Siphonanthus splendens* (G. DON.) HIERN. in Cat. Afr. Pl. Welw. I p. 841, ex BAKER & STAPF in This.-Dyer Flor. Trop. Afr. V (1900) p. 517 sub. C. splendens — *C. speciosum* HORT. (C. splendens × Thomsonae = C. speciosum Rollissoni Hort. = C. Rollissoni Hort. ex Rev. Hort. (1873) p. 471; (?) Teysm. & BINNEND. Cat. Plant. Hort. Bot. Bog. (1866) p. 386 nom. nud.).

Distribution: A native of Guinea, trop. Africa, imported into, and cultivated in Indonesia.

9. **Clerodendron Thomsonae** BALF. f. in Edinb, New. Phil. Journ. N. S. p. 1. v. 15 (Jan.-Apr. 1862) p. 233 t. 2.; HOOK. Bot. Mag. vol. 18 (1862) tab. 5313; BALF f. in Trans. Bot. Soc. Edin. VII (1863) p. 265 t. 7 et p. 580 t. 16 — *C. Balfouri* HORT. ex Flor. Mag. VIII (1869) sub t. 432 — *C. speciosum* HORT. (C. Thomsonae × C. splendens) ex LEM. Ill. Hort. XVI (1869) pl. 593;

Distribution: Trop. Afrika: a native of Upper-Guinea — In Indonesia often cultivated.

10. **Clerodendron laevifolium** BL. Bydr. Flor. Ned. Ind. 14e st (1826) p. 808 — *C. nutans* (non WALL.) JACK. Mal. Misc. vol. I. 1. (1820) p. 17; JACK. in HOOK. Bot Misc. I (1830) p. 284 — *C. Jackianum* WALL. in HOOK. Bot. Misc. I (1830) p. 284; Bot. Mag. (1831) note on 3049 C. nutans; WALL. Cat. No. 1794 (1828) nom. nud. — *C. acuminatum* WALL. Cat. 1792 (1828) ex WALP. Rep. Bot. Syst. IV (1844-1848) p. 113; SCHAU. in D.C. Prod. Syst. Nat. XI (1847) p. 662 — *C. disparifolium* (non BL.) HASSK. in Retzia I (1855) p. 57; MIQ. Flor. Ned. Ind. II (1856) p. 871 — Frutex 1-5 M. altus, in sylvis altioribus arbuscula usque ad 10-12 M. alta; ramuli obtuse tetragoni, subglabri; folia opposita, in forma novella frequenter alterna, vel ternata, plerumque altera minora, mediocriter petiolata, membranacea, oblonga vel oblongo-lanceolata, basi cuneato-acuminata vel obtusa, apice subabrupte attenuato-acuta, formis novellis exceptis, integerrima, utrinque glaberrima, supra flavescenter viridia, nitida, subtus pallidiora, opaca, parce glandulis peltatis vestida, nervis secundariis 4-6, subtus prominentibus, 3-20 c.M. longa, 1.5-9 c.M. lata; petiolus subteres tomento tenui obsessa vel fere glaberrima, 1-6 c.M. longus; inflorescentia terminalis brachiato-paniculiformis, laxa multiflorá 5-50 c.M. longa, 10-15 c.M. lata, apice subnutans, cymis axillaribus 3-15-floris composita; pedunculi atro-purpurei, teretes, dense pubescentes, 1.5-5.5 c.M. longi; bractei lanceolati vel subulati,

parvi, dense pubescentes; flores suaveolentes, mediocres, pedicellis 0 5-1 c M. longis, fructifer subduplo usque ad fere duplam magnitudinum elongatis; calyx atro-purpureus vel purpurascens, campanulatus, profunde quinquefidus laciniis ovato-oblongis, extus parce pilosis vel glabrescentibus, resinoso-punctatis, intus glabris, 0 3-0 6 c.M. longis, 0.1-0.15 c.M. latis, fructifer auctus; corolla pallide flavescens, novella chlorescens, purpurascens, regulariter 5-laciniata, tubo angusto, calyce 5-plo longiore, extus glaberrimo, intus a basi usque ad medium piloso, 2-3.5 c.M. longo, 0.1-0.15 c.M. diam., laciniis subrotatis, angusto-obovatis utrinque glabris vel extus minutissime puberulis, 0.6-1 c.M. longis, 0.15-0.20 c.M. latis; stamina longe exserta, corollae laciniis duplo longiora 1.5-2 c.M. longa, filamentis albidis, tetetibus, glabris, antheris pallide flavescentibus, ovatis, 0.10-0.15 c.M. longis ovarium ovatum, glabrum; stylus albido-virescens, teres et filiformis, glaber, longe exsertus, 3-4 c.M. longus, stigmate aequaliter bifido; drupa globosa, baccata, glabra, 0.7-1 c.M. diam., matura nigra, calyce fructifero $1^1/_2$-2-plo aucto, rubro, crasso, nitido, stellato, patente vel recurvato.

Coll. Herb. Bog.:

Java: Res. Bantam (BACKER No. 7083; 1254; 1345; 1774; FORBES No. 443; KOORD. No. 40668; 40746; 41250; 41377); Res. Batavia (ARSIN No. 19525; BACKER No. 4126; 5829; 9900; 10085; 10296; 21076; 21113; 22076; 23195; 25945; Bakh. No. 1151; 1731; 1732; 3802; 4084; Bakh. jun No. 509; De Monchy—Kota Batoe; HALLIER 14 Aug. and 1 Sept. 1896; KOORD. No. 24451; 31280; 44037; NOERKAS Febr. 1912; SOEGANDIREDJA No. 185, 228; Res. Preanger: (BAKH. No. 280; 633; 2109; 3081; 3117; 3135; 3182; 3185); Hall. f 28 Aug. 1895; Koord. No 34345); Kangean Arch.: (Backer No. 29566) - Sumatra: (BÜNNEMEIJER No. 3005; 3557; 3622; 3750; 3833; 4204; JACOBSON No 2449; LÖRZING No. 4205; 4394; 4600) - Malacca (RIDLEY Sept 1893).

Distribution: Mal. Arch.: Java! Sumatra! Malacca and Poeloe Penang!

11. **Clerodendron nutans** WALL. ex D. DON. Prod. Flor. Nep. (1825) p. 103; WALL. Cat. 1793 (1828; WALL. in Bot. Mag. (1831) t. 3049.— C. *penduliflorum* WALL. ex SCHAU. in DC. Prod. Syst. Nat. XI (1847) p. 664; WALL. Cat. No. 1795 (1828) nom. nud —C. *laevifolium* (not of BL.) H. J. L. Verb. Mal. Arch. (1919) p. 266.

Distribution: Brit.-India: Himalaya! Nepal! Sikkim! Assam! Bengal! Silhet! Burma! Chittagong! Ava!—In the Mal. Archipelago only cultivated!

12. **Clerodendron marophyllum** BL. Bydr. Flor. Ned Ind. 14e st. (1826) p. 809.—C. *phyllomega* STEUD Nom. Bot. Ed II pars. I (1840) p. 383.—C. *Diepenhorstii* MIQ Flor. Ned. Ind. Suppl. Sumatra (1860) p. 243 et p. 568—C. *myrmecophilum* RIDLEY Journ Bot XXXIII (1895) p. 42; Bot. Mag. vol 59 (1903) tab 7887.—C. *umbratile* KING et GAMBLE Kew. Bull. (1908) p. 110—C. *Williamsii* ELMER in Leafl Phil. II (1910) p. 684.

Distribution: Malacca! Malay-Archipelago! Philippines!

Var. α **typica** BAKH., nov. var—C. *macrophyllum* BL. (1826)— C. *phyllomega* STEUD. (1840)— C. *Diepenhorstii* Miq. (1860).

Frutex 1.5-3.5 M. altus; folia obovato-oblonga basi cuneata, obtusa vel rotundata, apice subabrupte breviterque acuminata, integerrima, raro apice brevissime repando-dentata vel subcrenulata, 15-45 c.M. longa, 6-17 c.M. lata; inflorescentia pyramidato-paniculata, 15-35 c.M. longa, 10-20 c.M. lata; flores magnitudine variabiles, vulgo majusculi; calyx campanulatus, 0.7-1.5 c.M. longus; *corolla* albida vel carnea, fauce purpurascens, tubo calycem 3-4-plo longiore, 2-3 c.M. longo, raro breviore, limbo subobliquo, laciniis elliptico-oblongis vel obovatis, 1-2 c.M. longis, 0.4-0.7 c.M. latis.

Coll. Herb. Bog.;

Java: Res. Preanger (BACKER No. 22884; BAKH. No. 759, 760, 824, 2581, 2942; WINCKEL No. 234, 345, 346, 13 Mch. 1919, 18 Apr. 1919 -Tjadas Malang); Res. Batavia (BACKER No. 26357; KOORD. No. 30749; Res. Bantam (KOORD. No. 41439)—Sumatra: (AJOEB No. 207; 442; BUNN. No. 4585, 4957; 8805, 8847, 10483a; GRASHOFF No. 481; JACOBSON No 2513, 2528; LÖRZING No. 5230, 5236; PRINGO ATMODJO No. 497; Teysm. No. 2539)—Borneo (JAHERI No. 38, 1205).

Var. β **sinuatolobatum** HALL. f. Med. Rijks Herb. Leiden No. 37 (1918 p. 73; —C. *Williamsii* ELM (1910) —Frutex ± 2 M. altus; *folia* obovato-oblonga, basi obtusa vel rotundata, apice subsensim lato-acuta, integerrima vel apice, 2-6 sinuato-lobata, 20-40 c.M. longa, 8-15 c.M. lata; *inflorescentia* paniculata, 15-40 c.M. longa, 15-20 c.M. lata; flores majusculi; calyx campanulatus, 0.7-1 c.M. longus; corolla salmonacea, tubo calyce subduplo longiore 1.5-2 c.M. longo, limbo subobliquo, laciniis elliptico-oblongis vel subobovatis 1-1.5 c.M. longis, 0.4-0.8 c.M. latis.

Coll. Herb. Bog.:

Philippines: Mindanao (ELMER No. 11149, 14236).

Distribution: Philippines!

Var. γ **myrmecophilum** (RIDLEY) BAKH.— *G. myrmecophilum* RIDLEY (1895)—C. *umbratile* KING et GAMBLE (1908);—Frutex 0.75-1 M. altus; folia oblongolanceolata vel elliptico-obovata, basi cuneato-obtusa vel subrotundata raro leviter cordata, apice sensim ecute acuminata, raro subobtusa, integerrima, 15-35 c.M. longa, 3.5-10 c.M. lata; inflorescentia paniculata 15-30 c.M. longa, 7.5-10 c.M. lata; flores minusculi; calyx subcampanulatus, 0.5-1 c.M. longus; corolla aurantiaca, tubo calyce 2-3-plo longiore 1-2.5 c.M. longa, limbo subobliqua, laciniis elliptico-oblongis, 0.7-1 c.M. longis, 0.3-0.5 c.M. latis.

Coll. Herb. Bog.:

Malacca (CHUA CHU KANG-RIDLEY-9 Nov. 1899)—Sumatra: (Siak: KOORD. No, 22415; 22418)—Batoe-Isl. (RAAP No. 120; 420)—Borneo: (AMDJAH No. 188).

Distribution: Mal. Arch.: Sumatra! Borneo!

13. **Clerodendron deflexum** WALL. Cat. 1808 (1822), nom. nud.; WALL. Plant. Asiat. Rar. 3 (1832) p. 10 t. 215.

Distribution: Mal.-Archip.: Sumatra! Banka! Billiton! Riouw! Lingga! Malacca! Poeloe Penang!

14. **Clerodendron calamitosum** LINN. Mant. Plant. I (1767) p. 90.— *Volkameria alternifolia* BURM. Flor. Ind. (1768) p. 137 t. 44.

Distribution: Mal.-Arch.: Java! Madoera! Sumatra! Banka! Celebes!(?) Borneo! (?) Malacca! Philippines!—much cultivated everywhere.

15. **Clerodondron breviflorum** RIDL. in Journ. Bot. XXXII (1895) p. 43.— C. *Curtisii* H. H. W. PEARSON in Kew. Bull. (1901) p. 142.—

Distribution: Malacca!

16. **Clerodendron disparifolium** BL. Bydr. Flor. Ned.-Ind. 14e st. [1826] p. 809.— C. *eriosiphon* SCHAU. in DC. Prod. Syst Nat XI [1847] p. 662; HASSK. Retzia [1855] p. 58.; MIQ. Flor. Ned.-Ind. II (1856) p. 869.— C. *obtusidens* MIQ. Flor. Ned.-Ind. II (1856) p. 870.—[?] C. *kinabaluense* STAPF. in Trans. Linn Soc Bot. (1894) p. 26 — Frutex vel arbuscula, altitudine 1-6 M.; *ramuli* subtetragoni, deinde subteretes, dense breviterque purpureo- vel albido-pubescentes, sparse lenticellati; folia opposita, saepe ternata, praecipue in ramulis novellis et floriferis, raro alterna, plerumque altera minora, breviter vel longe petiolata, membranacea vel subcoriacea, obovata vel oblonga, basi cuneata, obtusa vel subrotundata, raro subacuta, apice abrupte attenuato-acuta, raro obtusiuscula breviter acuminata, apicem versus grosse repando-dentata, majus raro obsolete denticulata, vel fere integerrima, utraque pagina tomento tenui obsessa, raro praeter nervos glabra, supra atro-viridia, subtus pallidiora, sparse glandulis peltatis vestita, nervis secundariis 5-7, subtus prominentibus, 5-25 c.M. longa, 1.5-15 c.M. lata; petiolus subteres, sparse subdense pubescens, 0.5-12 c.M. longus; inflorescentia vel pseudo terminalis brachyata paniculiformis foliosa vel in panicula distincte terminata, laxa multiflora, 10-30 c.M. longa, 2-30 c.M. lata, cymis 6-20-floris; pedunculi virides vel purpurei, teretes, dense purpureo-vel albido-pubescentes, 2-12 c.M. longi; bracteae, lanceolatae vel subulatae, parvae, dense purpureo-pubescentes; flores suaveolentes, mediocres, pedicellis purpureis vel viridibus, dense pubescentibus, 0.2-2 c.M. longis; calyx pallide virens vel atro-purpureus, campanulatus, quinquepartitus, 0.7-1.2 c.M. longus, 0.5-1 c.M. diam., laciniis lanceolatis acuminatis' apice subincurvis extus dense pilosis, resinoso-punctatis, intus sparse pilosis raro subglabris, 0.7-1.2 c.M. longis, 0.05-0.2 c.M. latis, fructifer auctus; corolla albida vel pallide flavescens, regulariter 5— laciniata, extus dense purpureo-vel albido-villosa, intus parce pilosa vel subglabra, tubo angusto, calycem 2 $\frac{1}{2}$-5-plo longiore, 2-4 c.M. longo, 0.07-0.15 c.M. diam., laciniis subrotundatis obovatis, 0.7-1.5 c.M. longis, 0.2-0.6 c.M. latis; stamina mediocriter exserta, corollae laciniis 1$\frac{1}{2}$-2-plo longiora, 1.2-2 c.M. longa, filamentis albis, teretibus, glabris, antheris pallide flaventibus vel purpureis, mox brunneis, lato-ovatis, 0.15-0.20 c.M. longis; ovarium ovatum, glabrum; stylus albus apicem versus viridescens, teres et filiformis, glaber, mediocreter exsertus, 3-5 c.M. longus, stigmate aequaliter bifido; drupa globosa, baccata, glabra 1 c.M. diam., matura nigra, calyce fructifero 2-3-plo aucto, rubro, crasso, nitido, stellato, patente vel recurvato.

Coll. Herb. Bog.:

Java: Res. Batavia (BAKH. No. 761, 4379, 4657); Res. Preanger (BACKER 27 Dec. 1910; No. 12447; 23249; BAKH. No. 125; 638; 882; 1503; KOORD. No. 32836; 34343; 34350; 39547; 41176; SCHEFFER,

Tjibodas; WINCKEL No. 64; 77; 13 Mrt. 1919); Res. Pekalongan (BEUMÉE No. 4354; KOORD. No. 27605; 36859; WüLFING No. 3918); Res. Banjoemas (BACKER No. 21004; DEN BERGER No. 283: KOORD. No. 27105; 39150); Kangean-Arch (BACKER No. 27599, 29030)—Sumatra: (CRAMER 23 et 25 Aug. 1915)—Siam (KERR No. 1435—*C. Garrettianum* CRAIB.)

Distribution: Java! Sumatra! Borneo! Siam!

17. **Clerodendron multiflorum** (BURM.) O. KTZE. Rev. Gen. Plant. II (1891)p. 506—*C. phlomides* L. f. suppl. (1781)p. 292—*C. phlomoides* Willd Spec. Plant. III pars I (1800) p. 386—*Volkameria multiflora* BURM. Flor. Ind. (1768 p. 137 t. 45-1.

Distribution: Brit. India!

18. **Clerodendron fortunatum** L. Cent Plant. II (1756) 23; LINN. Amoen. Acad. IV. (1759) p. 320; LINN. Spec. Plant. Ed. 2. II. (1763)p. 889—*C. pumilum* (LOUR.) SPRENG. Syst. Veg. II (1825)p. 759—*C. lividum* LNDL. Bot. Reg. (1825) t. 945—*C. castaneifolium* HOOK. & ARN. Bot. Beech. Voy. (1841) p. 205—*C. pentagonum* HANCE in WALP. Ann. Bot. Syst. III (1852-1853)p. 238— *Volkameria pumila* LOUR. Flor. Cochin. (1790)p. 388—A small schrub; *branchlets* cylindrical, with petioles and panicles densely tomentose, glabrous afterwards; leaves opposite varying from oblong-lanceolate to elliptic and subobovate, base cuneate or rotundate, apex acuminate or abruptly short-attenuate, margins coarsely and irregularly toothed or subentire, coriaceous, pairs of nerves 5-8, sparsely hairy on both sides, or subtomentose especially on the nerves, 5-15 by 3-6 c.M.; petioles 0.7-2 c.M. long; cymes axillary, trichotomous, 5-10 flowered, 2-4 c.M. in diam., with peduncles 1.5-2.5 c.M. long; pedicels 0.5-1 c.M.; calyx of a livid purple, campanulate, inflated, 5-edged, slit up almost down to the base, lobes 5, broadly ovate, acuminate, sparsely pubescent on both sides, 0.7-1.2 c.M. long, 0.7-1 c.M. diam; corolla white or yellowish, densely pubescent outside, especially on the lobes; the tube about as long as the calyx, limb subrotundate, lobes ovate, obtuse; stamens shortly exserted; drupe globose, four-lobed.

Distribution: China! Hongkong!

Coll. Herb. Bog.:

Whampoa (Hance No. 394)—Hongkong (WEISZ. No. 1914).

19. **Clerodendron porphyrocalyx** LAUT. & K. SCHUM. in Flor. Deutsch. Schutzgeb. Sudsee (1901) p. 526.— C. *floribundum* (not of R. BR.) K. SCHUM. in SCHUM. & LAUTERB. Flor. Deutsch. Schutzgeb. Südsee (1901) p. 525. — C. *rhytidophyllum* K. SCHUM. in SCHUM. & LAUTERB. Nachtr. Flor. Deutsch. Schutzgeb. Südsee (1905) p. 371.

Distribution: New-Guinea!

Coll. Herb. Bog.:

N.-Guinea: Kais. Wilh. Land (HOLLRUNG No. 631).

20. **Clerodendron ingratum** LAUT. et K. SCHUM, in SCHUM. et LAUT. Flor. Deutsch. Schutzgeb. Südsee (1901) p. 526. – C. *Weinlandii* K. SCHUM. ex H. J. L. Verb. Mal. Arch. (1919) p. 308 sub C. ingratum.

Distribution: New-Guinea!

Coll. Herb. Bog.

Finschhafen, N.-Guinea (LAUTERB. No. 810).

21. **Clerodendron indicum** (L.) O. KTZE. Rev. Gen. Plant. II (1891) p. 505.— C. *Siphonanthus* R. BR. in Ait. Hort. Kew. Ed. 2 IV (1812) p. 65. C. *longicolle* F. W. MEYER Primit. Fl. Esseq. (1818) p. 217; SPRENG. Syst. Veg. II (1825) p. 758. – C. *verticillatum* (ROXB.) D. DON. Prod. Flor. Nepal. (1825) p. 102.— C *fortunatum* (not of LINN.) BL. Bydr. Flor. Ned Ind. 14e st. (1826) p. 807.— C *angustifolium* (WILLD.) HASSK. Cat. Plant. Hort. Bot (1844) p. 136 sub. C. Siphonanthus.— C. *mite* (LINN.) VATKE Plant. It Afr. Hildebr in Linnaea (1830-1882) p. 537.— *Siphonanthus indica* LINN. Spec. Plant I (1753 p 159.— *S. angustifolia* WILLD. Spec. Plant. I pars II (1797) p. 606.– *Ovieda mitis* LINN. Spec. Plant. II (1753) p. 889.— *O. verticillata* ROXB. ex D. DON. Prod. Flor. Nepal. (1825) p. 102.— *O. inermis* (not of BURM. f.; in Flor. Ind. non adest) Index Kew. II (1894) p. 386.— *Montalbania* NECK. Elem. I (1790) p. 273, ex STEUD. Nom. Bot. ed. 2 (1840) p. 383 sub. C Siphonanthus, – *Lysimachia indica* BONTIUS Hist. Nat. Med. Ind. Orient. (1658) p. 159.

Distribution: India! Burma! Siam! Malacca! Indonesia: Java! Sumatra! Celebes! S-China!— usually cultivated, also known from Madagascar! Mascarenes! West-India!

22. **Clerodendron fistulosum** BECC. in Malesia II (1884-1886) p. 48 et t. IV.

Coll. Herb. Bog.:

Borneo (TEYSMANN No. 7927).

Distribution: Only known from Borneo!

23. **Clerodendron Ridleyi** KING et GAMBLE in Kew. Bull. (1908) p. 111.

Coll. Herb. Bog.:

Borneo (TEYSM.— Landak Ngabang; BECCARI No. 660).

Distribution: Malacca! Borneo!

24. **Clerodendron longiflorum** DECNE. N. Ann. Mus. III (1834) p. 400. DECNE. Herb. Timor (1835) p. 72— *C. laevifolium* (non BL.) DECNE. Herb; Timor. (1835) p. 71 - *C. ellipticum* ZIPP. ex MIQ. Flor. Ned. Ind. II (1856) p. 884 sub. C. longiforum — *C. longitubum* VAL. Bull. Dep. Agric. X (1907) p. 52.

Distribution: Mal.- Archip: Timor! New-Guinea!

25. **Clerodendron quadriloculare** (BLANCO) MERR. Bur. Gov. Lab. Bull. No. 35 (1905) p. 63 – *C. Blancoanum* VILL. Fl. Filip. Ed. 3. IV Nov. App. (1880) p. 161 — *C. Navesianum* VIDAL. Cat. Prov. Manila No. 398 (1880); MERR. Bur. Gov. Lab. Bull. No. 27 (1905) p. 69— *Ligustrum quadriloculare* BLANCO Flor. Fil. Ed. I (1837) p. 10.

Coll. Herb. Bog.:

Philippines (AHERN No. 3335; CELESTINO No. 7350; CURRAN No. 5472; EDANO No. 26854; MERR. No. 434; RAMOS No. 4960)—N- Guinea (TEYSM. No. 7794).

Distribution: Philippines! New-Guinea!

26. **Clerodendron minahassae** TEYSM. et BINNEND. in Nat. Tydschr. Ned. Ind. XXV (1863) Plantae Novae p. 409; MIQ. Ann. Mus. Bot. III (1867) p. 251 et tab. IX— *C. fortunatum* (not of LINN.) BLANCO Flor. Filip. (1837) p.

508— *C. Blancoi* NAVES Nov. App. Flor. Phil. BLANCO (1878) t. 223— *C. infortunatum* (not of LINN.) F. VILLAR in NAVES et F. VILLAR Nov. App. Flor. Phil. BLANCO (1880) p. 161— C. *calycinum* (not of TURCZ.) ZIPP. ex H. J. L. Verb. Mal. Arch. (1919) p. 315, sub. C. minahassae.

Distribution: Mal.-Arch.: Celebes and Soela-Isl.! Philippines!

27. **Clerodendron capitatum** (WILLD.) SCHUM. & THONN. Guin. Plant. in Kongl. Dansk. Vidensk. Selsk. Afk. 4 (1827) p. 61.—*C. Whitfieldii* SEEM. in Bonplandia X (1862) p. 250 —*C. mossambicense* KLOTZSCH.; *C. robustum* KLOTZSCH.; *C. stenanthum* KLOTZSCH. in Peters Reise Mossamb. I (1862) p. 258; 259.—*C. Francavilleanum* BUCHINGER ex BAKER in THIS. DYER. Flor. Trop. Afr. V (1900) p. 305, sub C. capitatum—*Volkameria capitata* WILLD. Spec. Plant. III pars. I (1800) p. 384.—*Siphonanthus capitata* (WILLD.) S. MOORE in Journ. Linn. Soc. XXXVII [1904—1906] p. 198.— Erect shrub or undershrub, 1-2 M. high; branclets obtusely tetragonous, the younger ones almost round, densely villous, glabrous afterwards; leaves opposite, sometimes alternate chartaceous, ovate or elliptic, often obovate, base abruptly obtuse, rounded or slightly cordate, apex abruptly acute-acuminate; margins entire or subundulate; pairs of nerves 3-7; reticulate, sparsely clothed with long hairs between the densely villous nerves above, densely and roughly villous with long simple hairs below; 5-12 (-25) by 2.5-5 c.M.; petioles round, densely woolly, the lower part woody and hardened, persistent in forming a recurved spine; 0.5-2 c.M. long; panicle-terminal, capitate, leafless; cymes hairy, bracts elliptical obovate, woolly, persistent, 0.5- by 0.15-0.50 c.M.; flowers almost sessile; calyx pale-green with purple teeth, tubuloso-campanulate, deeply 5-cleft and edged, 1-1.5 c.M. long, 0.7-1 c.M. diam., glabrous outside with ciliate limb, and peltate glands, glabrous inside; lobes ovate or oblong, acute, 1-1.2 c.M. long; corolla creamy-white, densely glandular-pubescent outside, puberulous towards the base of the tube inside; tube elongated, slender, abruptly curved and widened near the top, 7-12 c.M. long; lobes rather large, regularly radiate or subоblique, recurved, oblong or subobovate, 3-5 nerved, 1-1.2 by 0.5-0.7 c.M. stamens long exsert, 3.5-4 c.M.; style glabrous, long exsert, 10-12 c.M. long; *ovary* globose, glabrous.

Distribution: Trop. Africa—cultivated in Hort. Bog.

C. cephalanthum OLIV., treated by BAKER as a variety of *C. capitatum* (WILLD.) SCHUM. & THONN. most probably is a different species, though very nearly related. *C. cephalanthum* OLIV. should be a climbing shrub, the calyx of with is not green but red, and not edged.

28. **Clerodendron hastatum** (ROXB.) LINDL. in Bot. Reg. (1830) No. 1307; Bot. Mag. (1835) No. 3398.—*C. sagittatum* WALL Cat. No. 1786 (1828) ex SCHAU. in DC. Prod. Syst. Nat. XI (1847) p. 671 sub. C. hastatum—*Siphonanthus hastata* ROXB. Flor. Ind. III (1820) p. 67—A shrub or small tree, 3-5 M. high.; *branchlets* subquadrangular, densely pubescent and covered with dispersed lenticels; leaves opposite or ternate, broad-ovate, hastate, 3-5-lobed, lobes, ovate or oblong abruptly acuminate, the mid-lobe-largest, base cordate, margins entire, both surfaces pubescent with long hairs;

nerves 3-5 at the base, with 7-10 pairs of secundary nerves along the middle nerve; 15-25 c.M. by 15-25 c.M.; petioles 10-15 c.M.; panicles terminal, 15-25 c.M. long, 20-40 c.M. large, many-flowered, pedicels 1-1.5 c.M.; calyx campanulate, somewhat inflated, 2-2.5 c M. glabrous or slightly puberulous, lobes 5, 1-2 c.M. long, acute: in fruit enlarged and dark purple; corolla white or yellowish white, long pubescent outside, glabrous inside; tube 10-12 c.M. long; lobes narrowly oblong or obovate, obtuse or rouded at the top, 1.5-2 c.M. long, 0.5-0.7 c.M. broad; stamens long exsert, 3-5 c.M. long, purple; style 12-15 c.M. long, purple towards the top; drupe globose, slightly four-lobed, blue-black when mature.

Distribution: India! Khasia! Silhet! Assam-In Indonesia only a cultivated state.

29. **Clerodendron Colebrokianum** WALP. Rep. Bot. Syst. IV (1844-1848) p. 114.—*C. glandulosum* COLEBR. ex O. KTZE Rev. Gen. Plant. II (1891) p. 505; WALL. Cat. No. 1806 (1828) nom. nud.; WALP. Rep. Bot. Syst. IV (1844-1848) p 114 syn. sub. C. Colebrokianum —*C. ixoraeflorum* HASSK. in Retzia (1855) p. 60; Walp. Ann. Bot. Syst. V (1858) p. 711.—*C. foetidum* Bunge β *integrifolium* HASSK. in Retzia (1855) b. 61; MIQ. Flor. Ned. Ind. II (1856) p. 882. Adnot.

Coll. Herb. Bog.:

Sumatra (OUWEHAND No. 359; LÖRZING No. 4111)— India: Sikkim (THOMSON).

Distribution: India! Sikkim! Malacca! Mal.-Archip.! Sumatra!

30. **Clerodendron bracteatum** WALL. ex WALP. Rep. Bot. Syst. IV (1844-1848) p. 106; SCHAU. in DC. Prod. Syst. Nat. XI (1847) p. 665; WALL. Cat. No. 1800 (1828) nom. nud.— C. *densiflorum* GRIFF. Not. Plant. Asiat. IV (1854) p. 170.— C. *condensatum* MIQ. Flor. Ned. Ind. II (1856) p. 874.

Coll. Herb. Bog.:

Sumatra: (BÜNNEMEYER No. 3752; 5365; 5582; 5665.; LÖRZING No. 1572.; JACOBSON No. 2445.; TEYSM. No. 1167.).

Distribution: India! Sikkim! Bhotan! Assam! Mal.-Arch.: Sumatra!

31. **Clerodendron trichotomum** THUNB. Flor. Japon. (1784) p. 256; Bot. Mag. XXXVII. (1881) t. 6561.— C. *serotinum* CARR. in Rev. Hort. (1867) p. 351.

Distribution: Japan! China! Luchu (Riukiu) Arch.! Formosa! Philippines!

Coll. Herb. Bog.:

Japan (WEISZ No. 63).

32. **Clerodendron macrostegium** SCHAU. in DC. Prod. Syst. Nat. XI (1847) p. 666; MIQ. Flor. Ned. Ind. II (1856) p. 875.— (?) C. *grandiflorum* BLANCO Flor. Fil. Ed. I (1837) p. 512.

Coll. Herb. Bog.:

Moluccas (ROBINSON No. 1864; TEYSM. No. 5075; TREUB-Ceram 1893).—Philippines (AHERN No. 3330; ELMER No. 12161; MANGUBAT No. 936; MERR. No. 1026 spec. Blanc.; ROBINSON No. 1864).

Distribution: Moluccas: Amboina! Ceram!—Philippines!

33. **Clerodendron fragrans** (VENT.) WILLD. Enum. Hort. Berol. (1809) p. 659; R. BROWN. Gen. et spec. Plant. in Hort. Kew. Ed. II 4 (1812) p. 63; LINDL. in Bot. Reg. vol. 24 (1838) t. 41.— C. *fragrans* (VENT.) HORTUL. ex PERS. Syn. Plant. II (1807) p. 145, syn. sub. C. fragrans.—C *foetidum* BUNGE Enum. Plant. Chin. Bor. in Mém. Sav. Étr. Pet. II (1831) p. 125; BUNGE in Plant. Mong. Chin. No. 296 (1835) ex SCHAU.; PLANCH. iu Fl. des serres sér. I. IX (1853-1854) p. 17.— C. *foliosum* BUNGE Plant. Chin. No. 296 (1835) ex DIETRICH Syn. Plant. III (1843) p. 615—C. *Bungei* STEUD. Nom. Bot. I ed 2 (1840) p. 383.— C. *glandulosum* LNDL. Bot. Reg. (New. Ser.) (1844) t. 19 (Adnot.); SCHAU. in DC. Prod. Syst. Nat. XI (1847) p. 672—C. *speciosissimum* HORT. Angl. ex SCHAU in DC. Prod. Syst. Nat.—C. *Lindleyi* DECNE. ex PLANCH. in Flor. des Serres ser. I. IX (1853-1854) p. 17.—C. *macradenium* MIQ Flor. Ned. Ind. II (1856) p. 874. C. *roseum* HORT. ex CARR. Rev. Hort. (1876) p. 80 —C. *Riedelii* OLIV. in Journ. Linn. Soc. XV (1877) p. 100.—(?) *Volkmannia japonica* JACQ. Hort. Schoenbr. III (1798) p. 48 t. 338.—[?] *Volkmeria japonica* (not of THUNB.) HORTUL. ex WILLD. Spec. Plant III pars. I (1800) p. 385 sub. V. japonica Thunb.— *V. fragans* VENT. Jard. Malm. 1804) p. 70.— *Agricolaea fragrans* SCHRANK. in Denkschr. Akad. Moench. (1808) p. 98.

Distribution: China! Japan! Mal-Archip.: Java! Sumatra! Borneo! Celebes!; cultivated in India! Mauritius! Seychelles!

Var. α **typica** BAKH., nov. var.—CALYX 1.5-2.5 c.M. longus, anguste cupuliformis, usque ad medium quinque-laciniatus, laciniis lanceolatc-oblongis, attenuatis, rectis vel patulis; corolla albida vel pallide rosea, tubo calyce 1½-3-plo longiore, vel eo subaequante aut breviore, stamina 2.5-3.5 c.M. longa, *corollae* laciniis 2-3-plo longiora, interdum desunt.

f. 1. **typica**.— *macradenium* MIQ [1856]—PANICULA dense globosa, floribus simplicibus, FOLIA repando-acute dentata, basi obtusa vel rotundata, raro subcordata.

Coll. Herb. Bog.:

Java (BACKER No 25239: DOCT. V. L. No. 264; KOORD. No. 43189 - Sumatra: (BÜNNEMEYER No. 2536; 4442, 4799, 5653; GALOENGI No. 43 - JAÇOBSON No 2485; LÖRZING No 3535; OUWEHAND No. 314; PRINGO No. 119; RAAP No. 399).

f. 2. **corymbosa**—C. *Riedelii* OLIV. [1877]—PANICULA corymbosa, subfasciato elongata, floribus simplicibus; FOLIA subintegra, basi lato-ovata vel subcordata.

Coll. Herb. Bog.:

Celebes: (RIEDEL No. 1875; KOORD No. 2822).

f. 3. **pleniflora**—[?] *Volkmannia japonica* JACQ [1798]—*Volkameria fragrans* VENT [1804]—*Clerodendron fragrans* (VENT) WILLD. [1809] *Agricolaea fragrans* SCHRANCK. [1808]—PANICULA globosa vel glomerulata, floribus plenis, sterilibus; FOLIA grosse repando-dentata, basi lato-obtuse cuneata vel cordata.

Distribution: China! Japan! Philippines! Malay-Archipelago!

Malacca! Burma! India!—cultivated everywhere and often escaped; also in tropical Africa and Amerika.

Var. β **foetida** [BUNGE] BAKH.—*Clerodendron foetidum* BUNGE (1831)—C. *foliosum* BUNGE [1835] ex Dietrich. [1843] – C *Bungei* STEUD. [1840] – C. *roseum* HORT. ex. CARR. [1876]—CALYX 0.3-0.5 c.M. longus, lato-cupuliformis, breviter quinque-dentatus, dentibus lato-ovatis vel subtriangularibus, acutis, rectis vel subrecurvis; corolla rosea vel purpurea, tubo calyce 5-6-plo longiore; stamina 1.5-2 c.M. longa, corollae laciniis ± 1½-plo longiora.

Distribution: China!

34. **Clerodendron Cunninghamii** BENTH. Flor. Austr. V (1870) p. 64; BAILY Comp. Cat. Queensl. Flor. (1909) p. 386 pl. XI. – [?] C. *costatum* R. BR. prod. Flor. Nov. Holl. I (1810) p. 511.

An erect shrub, 3-5 M high; branchlets quadragular, mealy or almost glabrous, with many lenticels; leaves opposite, chartaceous, broadly ovate, rarely oblong, base broadly rounded or slightly cordate, apex acutely acuminate; margins entire, pairs of nerves 5-7; glabrous above, except on the nerves, subtomentose especially on the nerves, with some glands at the base; 10-25 by 7-15 c.M.; petioles terete, almost glabrous or mealy, 2-5 c.M. long; panicles terminal, broadly corymbose, leafy below, cymes; 2-5 c.M. peduncled, densely, shortly, appressedly hairy; bracts linear-lanceolate, tomentose 0.2-0 3 by 0.05-0.10 c.M.; pedicels 0.5-1 c.M. long; *calyx* green, campanulate, 5-cleft halfway down, 1-1.2 c.M. long, 0.7-1 c.M. in diam., densely and appressedly tomentose outside, without peltate glands, glabrous inside; lobes deltoid, acute, 0.4-0 6 c.M. long; corolla white, glabrous outside, glandular; tube slender, elongated, 4-6 c.M. long; lobes large, regularly spreading, recurved, oblong or obovate, 0 7-1 by 0.5-0.7 c.M. stamens long exsert, 3 5-4 c.M.; style glabrous, 7-8 c.M. long; ovary globose, glabrous; drupe globose, 4-lobed, black when ripe, 1 c.M. in diam.

Distribution: Australia! cultivated in Hort. Bog.

35. **Clerodendron villosum** BL. Bydr. Flor Ned. Ind. 14e st. (1826) p. 811—*Clerodendron spec.* LAM. Planch. Bot. III (1823) pl. 544—*C. molle* (not of H. B. K.) W. JACK. Mal. Misc. I. 1 (1820) p. 15; HOOK. in Bot. MISC. I (1830) p. 283;—*C. velutinum* WALL. ex DIETRICH Syn. Plant. III (1843) p. 617; WALL. Cat No. 1797 (1828) nom. nud.—*C. infortunatum* (not of L.) R. WIGHT. Icon. Plant. Ind. Or. (1850) pl. 1471—*C. affine* GRIFF. Not. Plant. Asiat. IV (1854) p. 170—*C. infortunatum* L. β *albiflorum* HASSC. Retzia II (1855) p. 28—*C. ferrugineum* TURCZ. in Bull. Soc. Imp. Mosc. III (1863) p. 221—*C. trichotomum* (not of THUNB.) WALL. Cat. No. 6315 B. fide CLARKE in HOOK. f. Flor. Brit. Ind. IV (1885) p. 595 syn. sub C. villosum—C. *Curranii* ELM. in Leafl. Phil. Bot. V. (1912-1913) p. 1847.

Distribution: Neilgherrie! Burma! Malacca! Malay-Archipelago! Philippines!

36. **Clerodendron brachyanthum** SCHAU. in DC. Prod. Syst. Nat. XI (1847) p. 668.

Coll. Herb. Bog.:

Philippines (AHERN No. 3193; CURRAN/MERRITT No. 8052; ELMER No. 7486, 9117, 13824, 16164, 17732; RAMOS No. 1534, 23392, 27367, 30281; ROBINSON No. 9271).

37. **Clerodendron lanuginosum** BL. Bydr. Flor. Ned. Ind. 14e st. (1826) p. 810.—C. *pubescens* WALP. in Nov. Act. Not. Cur. XIX. suppl. I (1843) p. 380.

Distribution: Mal.-Archip: Moluccas! Philippines!

Coll. Herb. Bog.:

Moluccas (ATASRIP No. 84; SANAäN No. 81, TEYSM. No. 5243, 5631).—Philippines (AHERN No. 691Q; ELMER No. 11338;) Mallonga No. 26265).

38. **Clerodendron viscosum** VENT. Jard. Mal. I (1803) p. 25 t. 25; Pers. syn. Plant. II (1807) p. 145; SIMS Bot. Mag. 43 (1816) t. 1805; Bot. Reg. 8 (1822) t. 629.—C. *infortunatum* LINN. Spec. Plant. II (1753) p. 637 (α); LINN. Spec. Plant. II (1763) p. 889 (α); GAERTN. Fruct. Sem. Plant. I (1788) p. 271; WILLD. Spec. Plant. III pars. I (1800) p. 386 α; DENNST. Schlus. Hort. Ind. Mal. (1818) p. 27—C. *cordatum* D. DON. Prod. Flor. Nepal (1825) p. 103—C. *canescens* WALL. ex STEUD. Nom. Bot. Ed. 2. I (1840) p. 382 Syn. sub C. viscosum—C. *macrocalyx* H. J. L. Verb. Mal. Arch. (1919) p. 293—C. *haematocalyx* HANCE ex WALP. Annal. Bot. Syst. III (1852-1853) p. 238; HANCE, Plant. Nov. Austr. Chin. diagn. ined. p. 10 ex Walp.—C. *castanaefolium* KLOTZSCH. in Reise Prinz. Wald. v. Preussen (1862) p. 102 pl. 65.—C. *calycinum* TURCZ. in Bull. Soc. Imp. Mosc. III (1863) p. 222.—C. *confusum* HALL. f. in Med. Rijks Herb. No. 37 (1918) p. 65.—*Volkameria Petasites* LOUR. Flor. Cochin. II (1790) p. 388.—*V. laurifolia* HORT. ex STEUD. Nom. Bot. Ed. I (1821) p. 207 and 890.—*Volkameria infortunata* (L.) ROXB. Flor. Ind. III (1832) p. 59; ROXB, Hort. Beng. (1814) p. 46 nom. nud.—*Clerodendron spec.* LINN. Flor. Zeyl. (1748) p. 104.—*Peragu* RHEEDE Hort. Ind. Mal. II (1679) t. 25; RAJUS Hist. Plant. (1693) p. 1571, Cap. VI; COMMELIN Flor. Malab. (1696) p. 31.

Distribution: India! Ceylon! Deccan! Himalaya! Bengal! Assam! Burma! Siam! Malacca! Hongkong! Mal-Archip.: Java!

Coll. Herb. Bog.:

Java (BACKER June 1910; No. 18395; 22055; 22840; BAKH. No. 386, 814; 815; HALLIER No. 40; 276; KOORD. No. 41242, 41366; ROEPKE- 21 Aug. 1918).—Siam (TEYSM. No. 5957; Simons-Febr. 1851—Burma (Anderson-10 Febr. 1868)—Tenasserim (Falconer No. 497)—Hongkong (WEISZ. No. 1929.)

39. **Clerodendron Preslii** ELM. Leafl. Phil. Bot. II (1908) p. 515.

Distribution: Philippines!

Coll. Herb. Bog.:

Negros (ELM. No. 10223).

40. **Clerodendron Cumingianum** SCHAU. in DC. Prod. Syst. XI (1847) p. 666.—*C. philippinum* SCHAU. in DC Prod. Syst. Nat. XI (1847) p. 667.

Distribution: Philippines!

Coll. Herb. Bog.:

Mindanao (ELMER No. 13559; RAMOS No. 14477).

41. **Clerodendron buruanum** MIQ. Ann. Mus. III (1867) p. 252.—C. *Lindawianum* LAUT. Flor. Deutsch. Schutzgeb. Südsee Nachtr. (1905) p. 372.—

C. *Versteegi* PULLE in Nova Guinea VIII (1911) p. 403.—C. *Vanoverberghii* MERR. Phil. Journ. Sc. VII (1912) p. 98.—C. *catalpifolium* HALL. f. in Med. 's Ryks Herb. Leiden No. 37 (1918) p. 67.—C. *brunfelsiiflorum* HALL. f. in Med. 's Rijks Herb. Leiden No. 37. (1918) p. 68.—C. *albiflos* H.J.L. Verb. Mal. Arch. (1919) p. 287.

Distribution: New-Guinea! Moluccas! Philippines!

Coll. Herb. Bog.:

Moluccas: Boeroe (TEYSM. No. 1874); Ambon (Teysm.); N- Guinea (Schlecht. No. 14455; VERSTEEG No. 1396).

42. **Clerodendron infortunatum** LINN. Spec. Plant. II (1753) p. 637 β; LINN. Spec. Plant. II (1763) p. 889 β; WILLD. Spec. Plant. III par. I (1800) p. 386 β.— C. *ovatum* POIR. in LAM. Enc. Méth. Bot. Suppl. IV (1816) p. 352.— C. *coromandelinum* SPRENG. Syst. Veg. II (1825) p. 758.— C. *vestitum* WALL. ex STEUD. Nom. Bot. Ed. 2. I (1840) p. 383 syn. sub. C. infortunatum.— *C. depauperatum* WALL. ex STEUD. Nom. Bot. Ed. II (1840) p. 383 sub. C. infortunatum — C. *adenophysum* HALL. f. Med. Ryks Herb. Leiden No. 37, (1918) p. 66.— *Clerodendron spec.* BURM. Thes. Zeyl. (1737) p. 66 tab. 29; LINN. Gen. Plant. II (1742) p. 290 No. 606; LINN. Gen. Plant. II (1764) p. 325 No. 789.

Distribution: India: Ceylon! Coromandel.!— Mal-Arch.: Sumatra! Borneo!

Coll. Herb. Bog.:

Sumatra [Bünnemeyer No. 100, 237, 241; JACOBSON No. 3013; LÖRZING No. 5604]. — Borneo (Jaheri No. 1729).

43. **Clerodendron Buchanani** (ROXB.) WALP. Rep. Bot. Syst. IV (1844-1848) p. 108; SCHAU. in DC. Prod. Syst. Nat. XI (1847) p. 672.— *C. infortunatum* (not of LINN.) MURRAY. Syst. Veg. (1797) p. 615; BL. Bydr. Flor. Ned. Ind. 14e st. (1826) p. 811.— *C. Buchananii* Herb. ROXB. ex WALL. Cat. 2653 (1828) nom. nud.— *C. fallax* LINDL. in Bot. Mag. vol. 30 (1844) p. 19 (non tab.) Adnot sub. *C. infortunatum*; WALP. Rep. Bot. Syst. IV (1844-1848) p. 108.— *C. Blumeanum* SCHAU. in DC. Prod. Syst. Nat. XI (1847) p. 669.— C. *foetidum* (not of D. DON., not of BUNGE) MIQ. Flor. Ned. Ind. II 1856) p. 881,—C. *papuanum* SCHEFF. Enum. Plant. N.-Guinée in Ann. Jard. Bot. Buitenz. I (1876) p. 41.— C. *puberulum* MERR. Phil. Journ. Sc. Bot. X (1915) p. 72.— (?) *Caprifolium scarlatinum* NORONH. in Verh. Bat. Genootsch. V (1790) p. 9 nom. nud.— *Volkameria Buchanani* ROXB. Flor. Ind. III (1832) p. 60; ROXB. Hort. Beng. (1814) p. 46 nom. nud.—*Petasites agrestis* RUMPH. Herb. Amb. IV (1750) p. 108 t. 49.

Distribution: India! Philippines! Malay Archipelago!

Var. α **typica** BAKH., nov. var.— Folia cordato-ovata, acuminata, margine dentata, adulta farinoso-tomentella; calyx ultra medium incisus; corolla parva, laciniis 0.7-1,2 c.M. longis, 0.4-0.5 c.M. latis; stamina 1.5-2.5 c.M. longa.

Coll. Herb. Bog.:

Java: BACKER No. 770; 1850; 6999; 10357; 14379; 23118; 25464; Apr. 1903; Bakh. No. 639. 1081, 1115, 1393, 4047; HALL. f. No. 47; KOORD. No. 24453; 30748; SCHEFF. 6. Oct. 1870; SOEGANDIREDJA No. 85; 129; 206.— Kangean Arch.: Backer No. 27948.—Sumatra: CRAMER No. 96; JACOBSON No. 74; 116; 2660; JODNER No. 321; RAAP 106, 479, 667.— Banka: BÜNNEMEIJER No. 2426 — Borneo: TEYSM.- Poentianak — Celebes: TEYSM. No. 12265; VAN VUUREN No. 16.—Molucc : BOERLAGE No. 16; 250; 410; ATJE exp. HULSTIJN No. 96; 309; ROBINSON No. 303.— Nov. Guinea: ATASRIP exp. WICHMANN No. 57.

Var. β **fallax** (LNDL.) BAKH., nov. var.— C. *fallax* LNDL. (1844).—C. *papuanum* SCHEFF. (1876).— Folia cordato-rotundata, apice obtusa vel rotundata, margine denticulata vel subintegra, dense tomentosa; calyx usque ad medium incisus; corolla pro ratione magna, laciniis 1.2-1.7 c.M. longis, 0.5-0.7 c.M. latis; stamina 2.5-3 c.M. longa.

Coll. Herb. Bog.:

Nov. Guinea: HOLLR. No. 431; Jaheri No. 195; Teysm. No. 7793.— Celebes: KOORD. No. 19502.

44. **Clerodendron speciosissimum** PAXT. in Bot. Mag. III (1837) t. 217 et 271—C. *infortunatum* (not of L.) LINDL. Bot. Mag. (1844) t. 19; PAXT. Bot. Mag. (1844) fig. 169.—C. *fallax* (not of LINDL.) SCHAU. in DC. Prod. Syst. Nat. XI (1847) p. 666; HASSK. in Retzia (1855) p. 59; MIQ. Flor. Ned. Ind. II (1856) p. 876.—C. *Horsfieldii* MIQ. Flor. Ned. Ind. II (1856) p. 880.— C. *Blumeanum* (not of SCHAU.) VAL. Plant. Pap. in Bull. Dép. Agr. X (1907) p. 52.— C. *pulchrum* FAWC. in FORBES Nat. Wand East-Arch. (year?) p. 54; FORBES Wand. Nat. f. Mal-Arch. II (1886) p. 226.

Distribution: Mal-Archip.: Sumatra! Java! Madoera! Timor!

Coll. Herb. Bog.:

Java: Res. Batavia (BACKER).- 8 Febr. 1903; BAKH. No. 3248, 3371; HALLIER No. 274; 20 Oct. 1894); Res. Preanger (BAKH. No. 1490); Res Pekalongan (BACKER No. 16488, 23275; Beumée No. 3799, KOORD. No. 22456, 27609, 36975); Res. Semarang (BEUMÉE No. 1177, 4105; A. 105; CORDES No. 58; KOORD. No. 28036, 41739, 41740); Res. Rembang (KOORD. No. 36137, 42456); Res. Madioen (BACKER No. 2788, 2945, 3377, 6697, 6845); Res. Kediri: (Backer No 11274, 11639; Den Berger—Sept. 1916 Beumée No. 2323; GRUTTERINK No. 3006, 3119; Jahmani No. 213; Koord. No 22952); Res. Soerabaja (BACKER No. 26617; Beumée No. 2486); Res. Besoeki (BACKER No. 7994, 17788, 17940, 25202; KOORD. No. 20647, 20651, 20652, 29119, 29952; ULTÉE No. 7); Res. Pasoeroean (Beumée No. 2756); Madoera (BACKER No. 18969, 20512)—Timor (FORBES No. 3604).

45. **Clerodendron paniculatum** L. Mant. Plant. I (1771) p. 90; HOOK. Bot. Mag. 46 (1890) tab. 7141.—C. *diversifolium* VAHL. Symb. Bot. Plant. II (1791) p. 75.—C. *pyramidale* ANDR. Bot. Repos. X (1799-1811) t. 628; Lam. Enc. Méth. Bot. Suppl. IV (1816) p. 353.—C. *splendidum* WALL. in CLARKE in HOOK. f. Flor. Brit. Ind. IV (1885) p. 593 syn. sub. C. paniculatum.—*Volkameria angulata* LOUR. Flor. Cochin. II (1790) p. 389.—*V. diversifolia* (in VAHL deest) ex CLARKE in HOOK. f. Flor. Brit. Ind. IV

(1885) p. 593 sub. C. paniculatum.—*Caprifolium paniculatum* NORONH in Verh. Bat. Genootsch. V (1790) p. 9.

Distribution: China! Formosa! Cochin-China! Siam! Burma! Malacca! Malay-Archipelago (Java! Sumatra! Banka! Batoe-Isl! Nias! Ternate!

46. **Clerodendron squamatum** VAHL. Symb. Bot. Plant. II (1791) p. 74; Bot. Reg. 8 (1822) p. 649.—C. *paniculatum* (not of LINN.) PERROTT. in Ann. Soc. Linn. Paris (1824), fide Robinson in Phil. Journ. Sc. Bot. III (1908) p, 305.—C. *Kaempferi* SIEB. Syn Plant. Oec. in Verh. Bat. Genootsch. XII (1830) p. 31.—C. *intermedium* CHAM. in Linnaea VII (1832) p. 105. C. *Kaempferi* F. E. L. FISCH. ex STEUD. Nom. Bot. Ed. 2. I. (1840) p. 383 in syn. C. squamatum; MORR. Ann. Soc. Gand. I (1845) p. 17 in syn. C. squamatum.— C. *coccineum* DIETR. Syn. Plant. III (1843) p. 616.—C. *dentatum* WALL. ex STEUD. Nom. Bot. Ed. 2. I (1840) p. 382; WALP. Rep. Bot. Syst. IV (1844-1848) p. 114; WALL. Cat. No. 1799 (1828) nom nud.—C. *urticifolium* WALL. ex SCHAU. in DC. Prod. Syst. Nat. XI (1847) p. 669; WALL. Cat. No. 1801 (1828) nom. nud.—C. *Bethunianum* LOWE Hist. of Borneo p. 378; Hook. Bot. Mag Comp. (1848) V 74. p. 30; Bot. Mag. (1849) t. 4485.—C. *scopiferum* MIQ. Flor. Ned. Ind. II (1856) p. 881; MIQ. Annal. Mus. Bot. III (1867) p. 253.—C. *singalense* MIQ. Flor. Ned. Ind. Suppl. Sumatra (1860) p. 568; MIQ. Annal. Mus, Bot. III (1867) p. 253 adnot.—C. *Rumphianum* DE VRIESE et TEYSM. in Flora XVIII. (1860) p. 622; MIQ. Annal. Mus. Bot. III (1867) p. 252.—C.*imperialis* CARR. in Revue Hortic (1874) p. 110.—C. *illustre* N. E. BROWN. in Gard. Chron. II (1884) p. 424.—C. *japonicum* MAK. Bot. Mag. Tokyo XVII (1903) p. 91.—C. ? *coccineum* H. J. L. Verb. Mal. Arch. (1919) p. 296.— ? *Volkameria japonica* THUNB. Flor. Jap. (1784) p. 255.—*Volkameria Kaempferiana* JACQ. Icon. Plant. Rar. III (1786-1793) t. 500;—*V. Kaempferi* WILLD. Spec. Plant. III pars. I (1800) p. 385.—*V. dentata* (WALL) ROXB. Flor. Ind. III (1832) p. 61.; Roxb. Hort. Beng. (1814) p. 46. nom. nud.—*V. urticifolia* (WALL) ROXB. Flor. Ind. III (1832) p. 61; ROXB. Hort. Beng. (1814) p. 46. nom. nud.—*V. inermis* (not of LINN.) BLANCO. Flor. Filip. Ed. I (1837) p. 511.—*V.* (*Bolkameria*) *casopanguil* BLANCO Flor. Filip, Ed. II (1845) p. 356.—*V. coccinea* HERB. de l' amat. t. 519 ex DIETR. Syn. Plant. III (1843) p. 616 sub. C. coccineum -*Petasites amboinensis* RUMPH. Herb. Amb. IV (1750) p. 107 t. 48.

Var. α **typica** BAKH., nov. var.—Inflorescentia laxa paniculata 10-40 c.M. longa, 10-25 c.M. lata; calyx 0.5-1.2 c.M. longus, laciniis oblongis acuminatis; corolla tubo calyce 2-4-plo longiore; stamina 3.5-7 c.M. longa, corollae laciniis 6-7-plo longiora.

Distribution: Japan! China! India: Hilamaya! Burma!-Philippines! Malay-Archipelago!

Var. β **Rumphiana** (DE VR. & TEYSM.) BAKH.—C. *Rumphianum* DE VRIESE & TEYSM. (1860).—Inflorescentia dense capitata vel pyramidato-glomerulata; panicula 7-12 c.M longa, 5-7 c.M. lata; calyx 1.5-2 c.M. longus, laciniis lanceolatis, attenuato-acutis; corolla tubo calyce $1^{1}/_{2}$-2-plo longiore; stamina 2-2.5 c.M. longa, corollae laciniis $2\text{-}2^{1}/_{2}$-plo longiora.

Distribution: Moluccas! New-Guinea!

Coll. Herb. Bog.:

Amboina (DE FRETES No. 5575); Boeroe (TEYSM. No. 1869).—Ceram (TREUB-1893)—New-Cuinea (JAHERI-March 6 th, 1901).

Var. γ **Bethuniana** (LOWE) BAKH.—C. *Bethunianum* LOWE. (1848).

Distribution: Mal.-Archip.: Borneo! Celebes!-Philippines!

Coll. Herb. Bog.:

Philipp.: (ELMER No. 12649).

47. **Clerodendron Hettae** HALL. f. in Meded. Rijks Herb. Leiden No 37 (1918) p. 82.

Distribution: Mal.-Archip.: Lombok!

Coll. Herb Bog.:

Lombok (ERNST-29 Mrch. 1906).

48. **Clerodendron magnificum** WARB. in Engl. Jahrb. XIII (1891) p. 428.—C. *utakwense* WERNHAM Rep. Bot. Woll. exp. Trans. Linn. Soc. Bot IX-I (1916) p. 137.

Distribution: New-Guinea!

Coll. Herb. Bog.:

Kais. Wilh. Lnd.: (HELLWIG No. 239); Dutch N-Guinea(VERSTEEG No. 1732).

Species unknown to me, or doubtful:

49. **Clerodendron barba felis** HALL. f. Med. Ryks Herb. Leiden No. 37 (1918) p. 74.

Distribution: Borneo!

50. **Clerodendron cernuum** WALL. nom. nud. ex STEUD. Nom. Bot. Ed. II pars I (1840) p. 382.

Distribution.: Ind. Or.!

51. **Clerodendron cruentum** LNDL. Gard. Chron. (1860) p. 456.

Distribution: Trop. Asia!

52. **Clerodendron discolor** BECC. Nelle For. di Borneo (1902) p. 203. nom. nud.

Distribution: Borneo!

53. **Clerodendron Elberti** HALL. f. Med. Ryks Herb. Leiden No. 37 (1918) p. 83.

Distribution: Mal.-Arch.: Soembawa!

54. **Clerodendron elegans** MANETTI ex LEM. Jard. Fleur. IV (1854) p. 47- C. *calamistratum* HORT. Belg. ex LEM. Jard. Fleur. IV (1854) p. 47.

55. **Clerodendron ellipticum** MERR. Phil. Journ. Sc. Bot. VII (1912) p 341 = (?) C. *Sahelangii* KOORD.

Distribution: Philippines!

56. **Clerodendron fastigiatum** (HUNTER) H. J. L. Verb. Mal. Arch. (1919) p. 317—*Volkameria fastigiata* HUNTER ex RIDLEY in Journ. As. Soc. Straits 53 (Sept. 1909) p. 102;—(= (?) C. *viscosum* VETN).

Distribution: Moluccas!

57. **Clerodendron Friesii** K. SCHUM. in SCHUM. & LAUTERB. Nachtr. Flor. Deutsch. Schutzgeb. Südsee (1905) p. 372.

Distribution: New-Guinea!

58. **Clerodendron glaucum** WALL ex. STEUD. Nom Bot. Ed. 2. I (1840) p. 383, nom nud.

Distribution: Ind. Or,!

59. **Clerodendron grandiflorum** (HOOK.) SCHAU. in DC. Prod. Syst. Nat. XI (1847) p. 659—*Aegiphila grandiflora* HOOK. Bot. Mag. II (1846)) t. 4230.

60. **Clerodendron haematolasium** HALL. f., Med. Ryks Herb. Leiden No 37 (1918) p. 69.

Distribution: Borneo!

61. **Clerodendron kalaotoense** H.J.L. Verb. Mal. Arch. (1919) p. 307.

Distribution: Celebes!

62. **Clerodendron lankawiense** KING & GAMBLE Kew. Bull. (1908)p. 110.

Distribution: Malacca!

63. **Clerodendron Lobbii** CLARKE in HOOK. f. Flor. Brit. Ind. IV (1885) p. 590=*Hosea Lobbii* (CLARKE) H.J.L. Verb. Mal. Arch. (1919) p. 237;—*Hosea Lobiana* RIDLEY in Journ. As. Soc. Straits 50 (1908) p. 125—*Clerodendron Lobbianum* [not of Clarke] Ridley en Journ. As. Soc. Str. 50 [1908] p. 125.—

Distribution: Borneo! Penang [?]!—See under Hosea.

64 **Clerodendron macrostachyum** TURCZ. Bull. Soc. Nat. Mosc. XXXVI II (1863) p. 220.

Distribution: Brit-India! Malacca!

65. **Clerodendron Manetti** VIS. Sem. Hort Patav. No. 2 [1848-1849]; VIS Ill. Piante Orto Padova III [1856] p. 20 t. 3—C. *Buchholzii* GÜRKE in Engl. XVIII. [1894] p. 176.

Distribution: Africa!

66. **Clerodendron membranifolium** H J.L. Verb. Mal. Arch. [1919] p. 318.

Distribution: Amboyna!

67. **Clerodendron multibracteatum** MERR. Phil. Journ. Sc. Bot. VII [1912[p. 98.

Distribution: Philippines!

68. **Clerodendron ovalifolium** [A. JUSS.) BAKH, nov. comb.—C. *floribundum* R. BR. Prod. Flor. Nov. Holl. I [1810] p. 511.—? C. *medium* R. BR. et ? C. *attenuatum* R. BR.; ? C. *ovatum* R. BR.; ? C. *coriaceum* R. BR. Prod. Flor. Nov. Holl. I [1810] p. 510 et 511.—C. *cardiophyllum* F. MUELL Fragm. Phyt. Austr. III [1862-1863] p. 144,—*Ovieda ovalifolia* A. JUSS. in Ann. Mus. Par. VII [1806]p. 76,—*Siphonanthus floribunda* [R. BR.] J. BRITTEN Bot. Cook. Voy [Year?] p. 45.

Distribution: Australia! New-Guinea!

69. **Clerodendron Powellii** BENTH. & HOOK. ex. DRAKE DEL CASTILLO Ill. Flor. Ins. Mar. Pacif, (1892) p. 261.

Distribution: Pacific.-Isl!

70. **Clerodendron pumilum** (not of SPRENG.) RIDL. Journ. Ass Soc. Straits I (1908) p. 126.— C. *sarawakanum* H. J. L. Verb. Mal. Arch. (1919) p. 248.

Distribution: Borneo!

71. **Clerodendron tomentosum** (VENT.) R. BR. Prod. Flor. Nov. Holl. I (1810) p. 510; Bot. Mag. (1813) t. 1518 — *Volkameria tomentosa* VENT Jard. Malm. (1804) t. 84.

Distribution: Australia!

Coll. Herb. Bog.: from Queensland and N. S.-Wales.

72. **Clerodendron tracyanum** F. MUELL in BENTH. Flor. Austr. V. (1870) p. 62.—*Premna tracyana* F. MUELL. et *Vitex tracyana* F. MUELL. Fragm. V. (1865-1866) p. 61.

Distribution: Australia! New-Guinea!

73. **Clerodendron violaceum** ZEYH. Hort. Schwetz. (1818) p. 54 ex LINK. Enem. Hort. Berol. II (1821-1822) p. 127.

Distribution: Unknown.

74. **Clerodendron Wenzelii** MERR. Phil. Journ. Sc. Bot. IX (1914) p. 385.— (=? C. *Cumingianum* SCHAU., or? C. *lanuginosum* BL).

Distribution: Philippines!

19. HOLMSKJOELDIA RETZ. (Auctore H. J. L.)

Obs. VI, 31 (1791): Verb 321

Distribution: Himalaya! Africa! Madagascar! cultivated in Asia!

1. **Holmskjoeldia sanguinea** RETZ. l. c.; Verb. 321.— Branchlets quadrangular, softly pubescent, as are petioles and peduncles; leafbase thinly chartaceous; both surfaces glabrous or sparsely pubescent except on the midrib; pairs of little prominent nerves 4-5; $5^{1}/_{2}$-8.7 by 3-4 6 c.M.; apex 1-1.3 c.M., subabrupt; petioles 1-2 c.M.; inflorescences paniculate, axillary, the uppermost ones forming together a ± leafless terminal panicle; lowest ones ± 15- florous, reaching 10 by 4 c.M., with two small leaves at the base, uppermost ones 1-florous, $2^{1}/_{2}$ c.M. long; calyx bright orange-red, spreading; margin entire, circular or indistinctly pentagonal, radially nerved, 1.8-2.3 c.M. in diam., glabrous without, very minutely puberulous within; pedicels slender, 0.4-1.1 c.M. long; corolla bright red, 1.7-2 c.M. long; tube narrowly infundibuliform, 1.5-1.7 c.M. long; limb oblique, with 5 small, subacute lobes; very sparsely puberulous without; stamens 0.2-0.3 c.M. exsert; insertion rather variable, either in the throat or about the middle of the corolla-tube; stamens didynamous, 0.4-0.1 and 0.5-1.2 c.M. long; style slender, 2-2.3 c.M. long, shortly bifid at apex; ovary glabrous; fruit globose, often verrucose, brown.

In Herb. Bog. from:

Java: EYKEN, Bandong, 700 M. in alt., flow. in Sept. 1912; culivated-HEINKE n. 11, Surakarta, cultivated.

Distribution: Subtropical Himalaya, 0-1300 M.! Prome Hills, Penang! Java!-cultivated.

20. PERONEMA JACK. (Auctore H. J. L.)

Mal. Misc. II, n. VII, 46 (1822); Verb. 321.

Distribution: Malay-Peninsula and Western part of-Archipelago.

1. **Peronema canescens** JACK. 1. c.; Verb. 322—*P. heterophyllum* MIQ. Fl. Ind. Bat. Suppl. I. 570 (1802)—A medium-sized tree, reaching ± 20 M. in height; COROLLA white, tube and CALYX greenish.

In Herb. Bog. also from:

Java: KOORDERS No. 29616, Buitenzorg, Hertenkamp; BIRKHOFF n. 11, Gambang; BACKER n. 10083, Djasinga; ID. nr. 7267 and 7190, Pasauran, Bantam; ID. n. 1044, Rangkasbitong; ? HAM n. 20, Bagelen.—Sumatra: KOORDERS n. 10479, Fort v. d. Capellen; LÖRZING n. 4042, Medan; ENDERT ns. 134 and 50, Palembang; GUSDORF n. 90, Lampongs; TEYSMANN n. 612, Batu Sangka, S. W. K.—Borneo: KOORDERS.

Native names: Djati sabrang (s.), Sungkè or Sungkai handak (m.).

Distribution: Malay Peninsula! Sumatra!, Java!, Borneo!

21. PETRAEOVITEX OLIV. (Auctore H. J. L.)

In HOOK. Ic. Pl. XV, 15, t. 1420 (1883); Verb. 323.

Distribution: Malay-Peninsula and-Archipelago! Philippines! Bismarck-Archipelago!

1. a. Cymules or cymes composing a terminal panicle; leaflets glabrous, or pubescent on the main nerves or on the lower side near the base only . . 2
   b. Cymules or cymes axillary; leaflets glabrous or pubescent 5
2. a. Leaflets $2^1/_2$-10 by 1.2-5 c.M. 3
   b. Leaflets (7-) 10-12 by ($2^1/_2$-) $6^1/_2$-$7^1/_2$ c.M., glabrous beneath, except on the midrib; lobes of fruiting calyx 1.5-2 by 0.5-07 c.M. . . **1. P. trifoliata.**
3. a. Leaves 3-foliolate, with plumose hairs on the lower surface near the base; leaflets 3-$6^1/_2$ by 1.6-4.2 c.M. . . . . **2. P. ternata.**
   b. Leaves biternate (3-9-foliolate) 4
4. a. Leaflets 1-4.3 by 0.6-2.6 c.M.; calyx subglabrate, corolla glabrous within and without. . . . . **3. P. sumatrana**
   b. leaflets $2^1/_2$-10 by 1.2-5 c.M.; calyx grey-tomentose, corolla pubescent without, villous within . . . . **4. P. multiflora**
5. a. Lower side of leaflets glabrous, or pubescent on the nerves only; cymes 12 c.M. long, $7^1/_2$ c.M. in diam., calyx-tube 0.6-0.9 c.M., capsule not striate . . . . **5. P. bambusetorum**
   b. Leaflets pubescent beneath 6
6. a. Leaflets 6, usually coarsely serrate; inflorescences 20-30 c.M. long; calyx-lobes in fruit 1 c.M. . . . . **6. P. pubescens**
   b. Leaflets 3, entire; inflorescences reaching 15 c.M. in length; calyx-lobes in fruit 1.9-2.5 c.M. . . . . **7. P. Scortechinii**

1. **Petraeovitex trifoliata** MERR., Phil. Journ. Sci. Bot. II, 425 (1907); Verb. 324. Distribution: Palawan! Mindanao!

2. **Petraeovitex ternata** HALL. f. Med. 's Ryks. Herb. Leid. no. 37,85 (1911); Verb. 325- Innovations densely pubescent, sometimes subglabrate; leaflets adult with plumose hairs on the lower surface near the base or nearly glabrous; 3-11 by 1.6-7 c.M.; petiolules 0.3-1.2, petioles 1.7-6 c.M.; fruiting calyx sparsely pubescent or subglabrate.

Var. α **typica** H. J. L., nov. var.— Innovationes dense pubescentes; foliola adulta pilis plumosis subtus prope basin vestita; 3-$6^1/_2$ c.M. longa, 1.6-4.2 c.M. lata; petiolulo 0.3-0.8, petiolo 1.7-5 cM. longo; calyx fructifer sparse pubescens.

Distribution: Borneo. (WINKLER n. 2756),—Mindanao. (HALLIER n. 4722).

Var. β **glabrior** H. J. L., nov. var.— Innovationes subglabrae; foliola adulta subtus subglabra; 5½-11 c.M. longa, 3.2-7 c.M. lata; petiolulo 0 4-1.2, petiolo 3.6-6 c.M. longo; calyx fructifer subglaber.

In Herb. Bog. from:

Borneo: NIEUWENHUIS n. 625, Sungei magne; ID. ns. 512 and 1100, Sungei Blu-u.

Distribution: Borneo! Mindanao!

3. **Petraeovitex sumatrana** H. J. L., nov. spec.—Frutex scandens?; ramuli quadrangulares, cum inflorescentiis et petiolis glabri; folia biternata, opposita; foliola parva, ovata vel ovato-lanceolata, basi late cuneata vel rotundata, apice acuta vel obtusiuscule breviterque acuminata, margine integra; utrinque glaberrima vel costa media subtus puberula; 1-4.3 c.M. longa, 0.6-2.6 c.M. lata; petiolo commune 2-4 c.M. longo; petiolis lateralibus secundi ordinis 1.3-1.7 c.M. longis, terminalibus 2-2½ c.M. longis; petiolulis 0.2-1 c.M. longis, subpuberulis; nervis utrinque circiter 4; inflorescentia axillaris, paniculata, 7-25 c.M. longa, 3-12 c.M. lata; bracteae minutae, lineares, 0.1 c.M. longae; cymuli 0.7-2 c.M. longi, oppositi, 2-5-flori; calyx glaber vel indistincte pulverulentus 0.2 c.M.; tubus infundibuliformis, 0.1 longus, lobis angustis 5, obtusiusculis, 0.1 c.M. longis, post anthesin valde augentes; pedicellus 0.1 c.M. longus; corolla ulrinque glabra; tubus infundibuliformis 0.2-0.25 c.M. longus, lobis reflexis 5, subaequalibus, 0.1 c.M. longis, obtusis; stamina 4, exserta, fauce vel paullo sub fauce inserta, 0.2 c.M. longa; filamentis gracilibus, lateraliter compressis; stylus 0.5-0.6 c.M. longus, lobis stigmaticis 0.05-0.1 c.M. longis; ovarium glabrum; fructus calyce inclusus; calyx frutifer glaberrimus, tubo costato, 0.3-0.5 c.M. longo, lobis membranaceis, spathulatis, sub-trinerviis, 1.4-1.9 c.M. longis, 0.3-0 4 latis; pedicellis 0.2-1 c.M.

In Herb. Bog. from:

Sumatra: AJOEB (Exp. JACOBSON) n. 183, Bencoolen, Rimbo pengadang, 1000 M. in alt., flow. on 16. VI. 1916; ID. n. 131, same locality, flow. and fruit on 10. VI. 1916.

4. **Petraeovitex multiflora** (SM.) MERRILL in Interpret. Rumph. Herb. Amb. 453 (1917).—*P. Riedelii* OLIV. in HOOK. Ic. Pl XV, 16, t. 1420 (1883).

In Herb. Bog. also (except cultivated specimens from Babar) [1]) from:

Mangoli-isl.: HULSTYN n. 45.

Distribution: Buru! Amboina! Saparua! Babar! Aru! Mangoli! New-Guinea! New-Britain! New-Zealand!

5. **Petraeovitex bambusetorum** KING et GAMBLE, Kew Bull. 113 (1908); Verb. 328.

Distribution: Malay Peninsula! Borneo!

6. **Petraeovitex pubescens** WARB., Engl. Jahrb. XIII, 427 (1891); Verb. 328.

Distribution: Little-Key!

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[1]) This specimen never have been seen flowering in the Botanical Gardens.

7. **Petraeovitex Scortechinii** KING et GAMBLE, Kew Bull. 113 (1908); Verb. 329.

Distribution: Malacca!

22. SYMPHOREMA ROXB. (Auctore H. J. L.)

Pl. Corom. II, 46, t. 186 (1798); Verb. 329.—*Sczegleewia* TURCZ. in Bull. Soc. Nat. Mosc. XXXVI, II, 212 (1863).

Distribution: British India (2 spec.), Philippines (1 spec.)

1. **Symphorema glabrum** HASSK., Flora XLVIII, 402 (1835); Verb. 330—*S. Cumingianum* BRIQ., nom. nud (?) in Engl. u. Prantl, Nat. Fl. Fam. IV, 3a, 180 (1897)—*S. luzonicum* F.-VILL in BLCO. Fl. Fil. ad III, Nov. App. 162 (1877)—*Sczegleewia luçonensis* TURCZ. Bull. Nat. Mosc. XXXVI, II, 212 (1863)—*S. luzoniense* VID., Synops. t. 75, fig. 7 (year ?)—Leaves reaching 16 by 4.8 c.M., petioles 1 c.M.; pairs of nerves 6 (ELMER n. 17419).

Distribution: Luzon!

23. SPHENODESME JACK (Auctore H. J. L.)

Mal. Misc. I, I, 19 [1820]; Verb. 331.

Distribution: British India! Malay-Peninsula and western part of -Archipelago!

1. a. Heads 3-flowered; [leaves 4-nerved, 7-13 by 2.8-5 c.M.; petioles 1 c.M. adult glabrous on both sides. . . . . 1. **S. triflora.**
   b. Heads 6-7 flowered leaves 4-10 by 1,8-5 c.M. 2
2. a. Calyx 5-toothed, with a horn-like tooth recurved from each sinus. . . 3
   b. Calyx 5-toothed, without horn-like teeth, 10-ribbed, ferruginous-pubescent and glandular without, minutely pubescent within, corolla-lobes pubescent without . . . . 2. **S. barbata**
3. a. Calyx 5-ribbed; corolla-lobes glabrous without; throat little villous . . . . 3. **S. Griffithiana**
   b. Calyx 10-ribbed; teeth ciliate; throat of corolla very densely villous . . . . 4. **S. pentandra**

1. **Sphenodesme triflora** WIGHT, Ic. t. 1478 (1850); Verb. 332.

Distribution: Malay Peninsula! Penang! Sumatra? Borneo!

2. **Sphenodesme barbata** SCHAUER, DC., Prod. XI, 623 (1847); Verb. 333.—*S. ferruginea* WIGHT, Ic. t. 1474 [1850].— *S. Winkleri* HALL. f., Med. 's Ryks Herb. Leid., no. 37,86 [1918].— *Congea barbata* WALL., Cat. no. 1738 [1828].

Distribution: Malay Peninsula! Penang! Borneo!

3. **Sphenodesme Griffithiana** WIGHT, Ic. IV, III, 14, t. 1477 [1850]; Verb. 334.

Distribution: British India! Malay Peninsula!

4. **Sphenodesme pentandra** JACK Mal. Misc. I, I, 19 [1820]; Verb. 335.—*S. acuminata* WIGHT, Ic. t. 1476 [1850].— *S. Jackiana* SCHAU., DC., Prodr. XI, 622, [1847]; MIQUEL, Fl. Ind. Bat. II, 909.— *S. Wallichiana* SCHAU., DC., Prodr. XI 622.— *Congea Jackiana* WALL., Cat. no. 1735.— C. *pentandra* WALL., Cat. no. 1734.— *Roscoea pentandra* ROXB. Fl. Ind. III, 54, (1832).— *Symphorema Jackianum* KURZ, For. Fl., , 255, (1877).

Distribution: British India! Hainan! Siam! Malay-Peninsula! Borneo!

24 CONGEA ROXB. [Auctore BAKH].

Pl. Coast Corom. III [1819] p. 90.; Verb. 336. — *Roscoea* ROXB. Flor. Ind. III [1832] p. 56; ROXB. Flor Ind. Caray ed. [1874] p. 477. — *Calochlamis* PRESL. Bot. Bemerk. [1844] p. 148.

Distribution: Coromandel! Bengal! Burma! Malacca!

1. a. Involucrum three-leafed; leaflets ovate or broad-elliptic, 2.5-3 c.M. long, 1.2-1.7 c.M. broad; calyx 0.7-1 c.M. long; corolla, filaments and style white; a very large climbing or sometimes tree-like shrub; leaves broad-ovate, cordate, 10-20 c.M. long, 7-13 c.M. broad; bracts sessile . . **1. C. tomentosa**
   b. Involucrum 3-4-leafed; leaflets oblong, obovate or spathulate, 1.5-3 c.M. long, 0.5-1 c.M. broad; calyx 0.4-0.7 c.M., corolla rose; filaments and style purple; a stout, extensive, scandent shrub; leaves ovate or oblong, obtuse or slightly cordate at the base, 3-16 c.M. long 2-7.5 c.M. broad; bracts shortly petioled. 2
2. a. Leaves softly villous on the upper surface, obtuse or cordate at the base; involucrum 3- (? 4) leafed; leaflets oblong-elliptical, or obovate-cuneate; calyx-teeth Lanceolate, acute; corolla glabrous or with some hairs in the throat; anthers dehiscent at the apex . . . . . . **2. C. villosa**
   b. Leaves shining, scabrid with some hairs along the nerves, or glabrous above, cuneate or rounded at the base; involucrum 3-4-leafed; leaflets long obovate or spathulate; calyx-teeth short and obtuse; corolla exserted, throat densely hairy: anthers dehiscent by a short longitudinal slit. . **3. C. velutina**

1. **Congea tomentosa** ROXB. Cat. Hort. Beng. [1795] p. 64; ROXB. Plant. Coast. Corom. III [1819] p 90 tom. 293; WIGHT Icon. Plant. Ind. Or. IV [1850] p. 15, pl. 1479/2 or 1565. — *Roscoea tomentosa* ROXB. Flor. Ind. III [1832] p. 56; ROXB. Flor. Ind. Carey Ed. [1874] p. 477. — *Calochlamis capitata* PRESL. Bot. Bemerk. [1844] p. 148; WALP. Rep. Bot. Syst VI [1846-1847] p. 691 — A very large climbing or sometimes tree-like shrub; bark of the old branches scabrous and ash-coloured, of the young shoots tementose; *leaves* coriaceous, broad, ovate, cordate, apex acute or sub-acuminate; pairs of nerves 5-7, hispid on the upper side, more or less villous or tomentose beneath; 10-20 by 7-13 c.M.; *petioles* 0.5-1 c M.; panicles large, axillary and terminal, reaching a length of 15, and a width of 22 c.M.; peduncles 1.5-2 c.M. long; involucra 3-leafed, leaflets lilac, oval or broad elliptic, obtuse at both ends, tomentose above, densely pubescent beneath, one of them often more or less deeply cleft, 2.5-3 by 1.2-1.7 c.M.; calyx 0.7-1 c.M., 5-toothed; teeth deltoid; inner and outerside long-pubescent; corolla white, glabrous except in the villous throat; tube slender, longer than the calyx or subequal, 0.7-1 c.M.; stamens exserted; anthers longitudinally dehiscent; ovary glabrous, glandular towards the top; style 1.5-2 c.M., with shortly bifid stigma.

Distribution: Goromandel Coast! Bengal! [ROXB.]! Khasya [GRIFF.]! Chittagong [ROXB.; KURZ.]! Ava [KURZ.]! Prome [SCHAU.]! Martaban [PRESL.]! Tenasserim [KURZ.]! Mergui [GRIFF.]! Siam [CLARKE; WATT]!

2. **Congea villosa** [ROXB.] WIGHT Icon. Plant. Ind. Or IV [1850] sub C. azurea Wall; WIGHT Ill. Ind. Bot. II [1850] p. 216. — C. *azurea* WALL. Cat. 1733 [1828] ex DIETR. Syn. Plant. III [1843] p. 619 sub. C. tementosa Roxb.; WALP. Rep. Bot. Syst IV [1844-1848] p. 116; WIGHT Icon. Plant. Ind. Or. IV [1850] p. 1479 A. — C. *tomentosa* ROXB. *Var β oblongifolia*

SCHAU in DC. Prod. Syst. Nat. XI]1847] p. 624.—C. *vestita* GRIFF. Not. Pl. As. IV [1854] p. 174 and Icon. Pl. As. [1854[pl. 458.—C. *tomentosa* ROXB. *Var azurea* [WALL.] CLARKE in HOOK f. Flor. Brit. Ind. IV [1885] p. 604.—C. *tomentosa* [Not of ROXB.] COOKE Flor. Pres. Bomb. [1908] p. 437.—*Roscoea villosa* ROXB. Flor. Ind. III [1832] p. 55; ROXB. Flor. Ind. Carey Ed [1874] p. 476—A stout, large, scandent shrub; branchlets, petioles and inflorescences grey- or ± ferruginous-tomentose; leaves coriaceous, ovate or oblong, obtuse or slightly cordate at the base, apex obtuse or schortly acuminate, pairs of nerves 3-6, softly villous on the upper surface, pubescent beneath - 3-16 bij 2-7.5 c.M.; petioles 0.5-1.3 c.M. panicles large, terminal, trihotomous and axillary, reaching a length of 15-30, and a width of 5-20 c.M.; peduncles 1-1.5 c.M. long; involucra 3 [?-4]-leafed; leaflets rose or whitish [? azure], elliptic or obovate-cuneate, tomentose above, densely pubescent beneath, one of them frequently two-veined and emarginate; 2-3 by 0.5—0.8 c.M.; calyx 0.5—0.7 c.M., 5-toothed; teeth lanceolate acute; inner and outer side long-pubescent; corolla rose, glabrous on both sides or with some hairs in the throat; tube schort, frequently shorter than the calyx, 0.35—0.50 c.M.; stamens exserted; anthers dehiscent at the apex; ovary glabrous, glandular towards the top; style 1—1.5 c.M., with slightly bifid stigma.

Distribution: Malacca: Pegu-Rangoon (ROXB.)! Martaban (VOIGT)! Tenasserim (CLARKE)! Mergui (GRIFF.)!

3. **Congea velutina** WIGHT. Icon. Plant. Ind. Or. IV (1850) pl. 1479-3 or 1566 and pl. 1479 B; WIGHT. Ill. Ind. Bot. II (1850) p. 216—*C. Forbesii* KING and GAMBLE in Bull. Misc. Inf. Kew (1908) p. 114; KING GAMBLE Mat. Flor. Mal. Pen. (1909) p. 1076; Verb 337; *C. tomentosa* (NOT of ROXB.) KING/GAMBLE Mat. Flor Mal. Pen. [1909] p. 1076; Verb. 338— A stout, extensive, scandent shrub; branchlets, petioles and inflorescences cinnamomeously or ferrugineously tomentose; leaves coriaceous, ovate or oblong, cuneate-obtuse or rounded at the base, apex obtuse or shortly acuminate, pairs of nerves 3—5, upper side glabrous, shining or scarcely hispid, especially on the nerves, lower side shortly hairy on the veins; 3—15 by 2—7 c.M.; petioles 0.5—1.5 c.M.; panicles large terminal and axillary, reaching a length of 50-100 c.M., and a width of 20-50 c.M.; peduncles 0.7-1.2 c.M. long; involucra 3-or 4-leafed; leaflets rose or lilac, obovate-spathulate, dilated and cohering at the base, forming a cup, sometimes three-or 4-leafed and then free, tomentose above, villous beneath; 1.5-3 by 0.5-1 c.M.; calyx 0.4-0.6 c.M., 5-toothed; teeth short, obtuse; in and outside velutino-pubescent; corolla rose, glabrous except in the villous throat; tube slender, exserted, 0.6-1 c.M.; stamens exserted; anthers dehiscent by a short, longitudinal slit; ovary glabrous, glandular towards the top; style 1-1.5 c.M, with slightly bifid stigma.

Distribution: Malacca: Tavoy (WIGHT, CLARKE)! Tenasserim! Mergui (GRIFF.)! (?). Sumatra: Lampong (KING/GAMBLE)! often cultivated, especially the form with the 4-leafed involucrun.

25. AVICENNIA LINN (Auctore BAKH.)

Syst. Ed. I. (1735) p. 894, Verb. 339; BAKH. Rev. Gen. Avic. in Bull. Jard. Bot. Buitenz. Sér III Vol. 3. ined.—*Bontia L.* Gen. Ed. I (1737)p. 180.— *Donatia Loefl.* Iter. Hisp (1758)p. 193— *Upata adans.* Fam. Plant. II (1763)p. 201- *Sceura Forsk.* Flor. Aeg.-Arab. (1775)p. 37.—*Racka Bruce* Trav. A byss. et Nub. V. (1790) App. p. 44.—*Halodendron* DU PET. THOU. Gen. Nov. Madag. (1806)p. 8.— *Hilairanthus* VAN TIEGH. Avic. et Symph. in Journ. Bot. XII (1898)p. 357 et 358.

Distribution: In estuaries and along the sea-coast of the tropical and subtropical part of the world.

1. a. Flowers more than 0.6 c.M. long and 1—1. 5 c.M. in diam when spreading; ovary and style long-villous, the latter slightly cleft at the apex; teeth acute unequal, approximated, much shorter than the style. . . 1. **A. officinalis**
 b. Flowers less than 0.6 c.M. long and 0.25—0, 50 c.M. in diam when spreading ovary villous in the upper, glabrous in the lower half, with glabrous style, which is distinctly bifid at the apex; teeth equal, dilated, lanceolate, obtuse, enlarging and spreading afterwards, recurved, as long as the style or longer. . . . . 2. **A. marina**

1. **Avicennia officinalis** L. Spec. Plant. I [1753] p. 110; WIGHT Ill. Ind. Bot. II [1850] p.— 217. KOORD. Atl. Baumart. Java II [1914] fig. 274 and fig 273 L; Verb. pl. III a and b.; BAKH. Rev. Gen. Avic in Bull. Jard. Bot. Buitenz. Sér. III Vol. 3 ined.—*A. tomentosa* [not of JACK.] WILLD. Spec Plant. IIIp. I (1797—1830) p. 395; PERS. Syn. Plant. II [1807] p. 143; BLUME Bijdr. Flor. Ned.-Ind. 14e st. [1826] p. 821; WALL. Plant. Asiat. Rar. III [1832]p. 44 tab. 271; WIGHT Icon. Plant Or. IV. [1850] pl. 1481— *A. Oepata* HAMILT Comm. Hort. Malab. in Trans. Linn. Soc XVII (1837) p. 221— *A. obovata* GRIFF. Not. Plant. Asiat. IV [1854] p. 189—*Avicennia spec.* LINN. Gen. Plant. [1742] p. 44; LINN. Flor. Zeyl. [1748] p. 23— *Anacardium* BAUHIN Pin. Theatr. [1671] p. 512. V variat. in. Malavar— *Anacardium orientale* JOUSTON Dendr. [1662] p. 156— *Oepata* RHEEDE Hort. Malab. IV [1683] A. 45; RAJUS Hist. Plant. II [1693] p. 1566.—

Distribution: In the mangrove-forests in the vicinity of tidal creeks along the sea-coast of Asia from Persia to Burma and Malacca! the Malay-Archipelago! Philippines! China!

2. **Avicennia marina** (FORSK). VIERH. (s.l.) Beitr. Kennt. Flor. Südarab, Socotra, etc, in Denkschr. Akad. Wissensch. Band 71 (1907) p. 435.; BAKH. Rev. Gen. Avic. in Bull. Jard. Bot. Buitenz. Sér III vol. 3 ined. *A. resinifera* FORST. Plant. Escul. Ins. Ocean. Austr. (1786)p. 72— *A. tomentosa* (not of LINN). VAHL. Symb. Bot. Plant. I. (1790)p. 47; SPRENG. Syst. Veg. II (1825)p. 768; R. BROWN, Prod. Flor. Nov. Holl. Ed. Nees. ab Esenb I (1827)p. 374; DIETR. Syn. Plant. III (1843)p. 619; MIQ. in Linnaea 18 (1844)p. 264; WALP. Rep. Bot. Syst. IV (1844-1848)p. 133. Arabia and Australiasica; BLANCO Flor. Filip. Ed. II (1845)p. 353; GRIFF. Not. Plant. Asiat. IV (1854)p. 185— *A. alba* BL. Bydr. Flor. Ned. Ind. 14e st. (1826)p. 821; Wight Icon. Plant. Ind. Or. IV (1850)p. 1482— *A. nitida* (not of JACQ) THUNB. Flor. Jav. (1825)p. 15; BLANCO Flor. Fil. Ed. I

(1837)p. 504— *A. resinifera* GRIFF. in Trans. Linn. Soc. XX (1846)p. 6, tab. 1; GRIFF. Not. Plant. Asiat. IV (1854)p. 186— *A. intermedia* GRIFF. in Trans. Linn. Soc. XX (1846) p. 6. tab. 1; GRIFF. Not. Plant. As. IV (1854)p. 188— *A. officinalis* (not of L.) SCHAU. in DC. Prod. Syst. Nat. XI (1847)p. 700; SCHAU in Mart. Flor. Bras. IX (1851)p. 306; HOOK. f. New. Zeal. Flor. (1867)p. 224; BENTH. Flor. Austr. V (1870)p. 69; BRANDIS For. Flor. (1874)p. 371; KURZ. For. Flor Brit. Burma II (1877)p. 275; BAKER Flor. Maur. Seych. (1877)p. 257; BOISSIER Flor. Orient. IV (1879)p. 536; CLARKE in HOOK. f. Flor. Brit. Ind. IV (1885)p. 604 *var alba* (Bl); KARSTEN Mangr. Veg. Mal. Arch. (1891)p. 5,20,36, etc. and taf VI fig. 46, taf. VIII fig. 112-118, taf X pl. 140; BOERL. Handl. Flor. Ned. Ind. II (1899)p. 667, 683; BAILY Qneensl. Flor IV (1901)p. 1185; CHEES. Man. New Zeal. Flor. (1906)p. 566; VAL. Plant. Pap. in Bull. Dep. Agr. Ind. Neerl. X (1907)p. 53, var eucalyptifolia Val.; SIM. For. Flor. and For. Res. Port. East. Afr. (1909)p. 94 et pl. 83; MUSCHL. Man. Flor. Egypt. I et II (1912)p. 813; KOORD. Atl. Baumart Java II (1914)p. fig. 273; Verb. 341.— *A. eucalyptifolia* ZIPP. ex MIQ. Flor. Ned. Ind. II (1856)p. 912 sub A. officinalis; VAL. Plant. Pap. in Bull. Dép. Agr. Ind. Néerl. X (1907) p. 53 sub A. officinalis.— *A. spicata* O. KTZE Rev. Gen. Plant. II (1891)p. 502— *A. mindanaense* ELM. Leafl. Phil. Bot. VIII (1915)p. 2868—*A. alba* BL. *Var. acuminatissima* MERR. Phil. Journ. Sc. C. Bot. XI 6 (Nov. 1916)p. 311— *A. Rumphiana* HALL. f. Med. Rijks. Herb. Leiden No. 37 (1918)p. 89— *Sceura marina* FORSK. Flor. Aeg. Arab. (1775) Cent. II p. 37— *Racka torrida* BRUCE Trav. Abyss. et Nub. V (1790) App.p. 44— *Racka Ovata* ROEM. et SCHULT. Syst. Veg IV (1819)p. 207.— *Halodendron* DU PET. THOU., Gen. Nov. Madag. (1806) p. 8 No. 26; LAM. Enc. Méth. Suppl. V (1817) p. 698; Roem & SCHULT. Syst Veg. IV (1819) p. 34 et 519 sub. Avicenniae.— *Halodendron Thouarsi* ROEM. & SCHULT. Syst. Veg. III (1819) p. 485—*Anacardium* BAUHIN Pin Theatr. Bot. (1623) p. 511 V.— *Mangium album* RUMPH. Herb. Amb. III (1750) p. 116. tom. 76.—

Distribution: In the mangrove-forests along the sea-coast of E-Africa and Arabia! Asia! the Malay-Archipelago! Australia! N-Guinea! Polynesia! Philippines! China!

Var a. typica. BAKH. Rev. Gen. Avic. in Bull. Jard. Bot. Buitenz. Sér. III vol. 3 ined.— *Sceura marina* FORSK. (1775)— *Racka torrida* BRUCE (1790).— *Halodendron* DU PET. THOU. (1806).— *Racka ovata* ROEM. et SCHULT. (1819).— *Halodendron Thouarsi* ROEM. et SCHULT. (1819)—*Folia* ovate vel lanceolato-oblonga, utrinque attenuata, subtus albida vel argenteo-nivea, 5-12 c.M. longa, 2.5-5 c.M. lata; *cymae* glomeratae; *stylus* filiformis (vel fere abest?), stigmatibus eadem longitudine ut stylus, fructus ovoideus mucronatus, amygdaliformis.

Distribution: E-Africa and Arabia!

Var. b. alba (BL) BAKH. Rev. Gen. Avic. in Bull. Jard. Bot. Buitenz. Sér. III vol. 3 ined.— *Anacardium* BAUHIN (1623)— *A. alba* BL. (1826)— *A. resinifera* GRIFF. (1851)— *A. officinalis* L. *var. alba* (BL) *Clarke*

(1885)-- *A. spicata* O. KTZE (1891)—*Folia* oblonga vel elliptico-lanceolata, utrinque acuta, subtus argentea, 3-16 c.M. longa, medio 1.5-5 c M. lata; *cymae* spicatae plus minusve densae et elongatae; *stylus* brevissimus vel fere abest, stigma stylo longius; *fructus* oblique conoideus, apice angustatus.

Java: BAKH. No. 1718-1722, Maroenda, Nov. 11 th., 1917.

Distribution: Brit. India from Bengal to Burma and Malacca; the Malayan Arch.; Philippines; New Guinea and Polynesia!

Var. **c. resinifera** (FORST.) BAKH. Rev. Gen. Avic. in Bull. Jard. Bot. Buitenz. Sér. III vol. 3 ined.—*A. resinifera* FORST. (1786)— *A. eucalyptifolia* ZIPP. ex MIQ. (1856)—*A. officinalis* L. *var. eucalyptifolia* (ZIPP.) Val. (1907)—*A. mindanaense* ELM. (1915)—*A. alba* BL. *var. acuminatissima* MERR. (1916)—*Folia* ovato-elliptica vel ovato-oblonga, utrinque attenuata, subtus viridi-canescentia, 7-16 c.M. longa, 1.5-3 5 c.M. lata; *cymae* capitatae vel pyramidales; *stylus* brevis, stigma stylum subaequans; *fructus* lato-ovoideus, mucronatus.

N. Guinea: VERSTEEG No. 1893, Merauke, Nov. 6 th. 1917; BRANDENH. No. 227, Gelieb, Nov. 13 th. 1917.— Moluccas: ROBINSON No. 1862, Ambon, July/Nov. 1913; Atjè exp. HULSTIJN No. 114 Taliaboe-Isl.

Distribution: Australia! New-Guinea! Timor! Molucca-Isl.! Philippines!

Var. **d. intermedia** (GRIFF.) BAKH. Rev. Gen. Avic. in Bull. Jard. Bot. Buitenz. Sér. III vol. 3 ined.—*A. alba* (not. of BL.) WIGHT. (1850)—*A. intermedia* GRIFF. (1856)—FOLIA rotundato-ovata vel oblonga, utrinque obtusa vel subrotundata, raro breviter acuminata, subtus albido-virescentia, 3—8 c.M. longa, medio vel paullo infra 2-4 c.M. lata; cymae capitatae; stylus brevis, stigma stylum subaequans; fructus amygdaliformis vel late-ovoideus, mucronatus.

Java: BAKH. No. 448, 449, Maroenda, Nov. 1917; No. 2127; No. 2128, Batavia, Juli 1919.

Distribution: Brit-India from Malabar to Malacca; Malay-Arch.; Philippines.

Var. **e. Rumphiana** (HALL. f.) BAKH. Rev. Gen. Avic. in Bull. Jard. Bot. Buitenz. Sér. III vol. 3 ined.—*Mangium album* RUMPH. (1750)—*A. nitida.* (not of JACQ.) BLANCO (1837)—*A. tomentosa* (not of JACQ.) BLANCO (1845)—*A. Rumphiana* HALL. f. (1918)—FOLIA obovata, raro suboblonga, majuscula, eis A. officinalis L. conformia, basi attenuata, apice obtuso-rotundata, subtus (in sicco) rava vel fulva, 5—10 c.M. longa, supra medium 2.5—5 c.M. lata; cymae capitatae; stylus brevis vel fere abest stigma stylum subaequans; fructus ignotus, (? parvus).

Amboina: ROBINSON No. 301, July Nov. 1913—Philippines: AHERN No. 116Q—1901/1902, Luzon; CURRAN No. 3536, Palawan, Dec. 1905; RAMOS No. 4954, Luzon, Dec 1907; CURRAN No. 19385, Negros, June 1910; MIRANDA No. 18272, Mindanao, May/June 1912.

Distribution: New-Cuinea! Aboina! Philippines! Singapore!

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10. a. Heyne, K., De nuttige planten van Nederlandsch-Indië, IV, 105-1917.
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ABBREVATIONS.

s. = sundanese.
m. = malay.
j. = javanese.
Celebes tw. = tonsawang-language.
id. tt. = tontemboan- or tompakawa-language.
Minah. = Minahassa [N.-Celebes].

Herb. Bog. = Herbarium of the Botanical Gardens of Buitenzorg.
Sum. = Sumatra.
S.W.K. = West-Coast of Sumatra [Residency].
S.O.K. = East-Coast of Sumatra [Government].
Lamp. =Lampong-Districts [Residency], Sumatra.
Verb. = H. J. Lam. The verbenaceae of the Malayan Archipelago, etc.

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ADDITIONS AND ALTERATIONS.

Page 2, number 9 of the key is to be read as follows:
9, a. Pyrenes 2-celled, 2-seeded . . . . **5. Priva.**
b. Pyrenes 2-celled, 1-seeded . . . . **3. Lippia.**
c. Pyrenes 1-celled, 1-seeded . . . . **4. Stachytarpheta.**
„ 2, line (s) 30, instead of **23**, read **24**.
„ 3, „ 25, „ „ **Sijmphorema**, read **Symphorema**.
„ 6, „ 35, „ „ Tjilibis , „ Tjilèlès.
„ 7, „ 31, „ „ (1753) , „ (1758).
„ 7, „ 36, „ „ (1821) , „ (1841).
„ 8, „ 13, „ „ perceived , „ observed.
„ 9, „ 19, after (1823) p., add 11,.
„ 11, „ 18, instead of 664 , read 644.
„ 11, „ 31, after (1823) p., add 11,.
„ 12 „ 3, instead of 1-2 c.M. , read 1-5 c.M.
„ 12, „ 39, „ „ **typica** , „ **genuina**.
„ 14, „ 10, „ „ **typica** , „ **genuina**.
„ 15, „ 11, „ „ 19509 , „ 19500.
„ 16, „ 17, „ „ **typica** , „ **genuina**.
„ 16. „ 18, „ „ *basislanensis* , „ *basilanensis.*
„ 17, „ 32, „ „ 1-5-3.5 , „ 1.5-3.5.
„ 18, „ 25.30, „ „ punctatis , „ punctis.
„ 18, „ 39.43.46, „ „ resinis , „ resinoso—.
„ 19, „ 1, „ „ resinis , „ resinoso—.
„ 19, „ 19, „ „ **typica** , „ **genuina**.
„ 26, „ 25, after WALL., add (partly).
„ 29, „ 28, instead of 10-55 c.M. longa, 5-19 c.M. lata, read 10-65 c.M. longa, 5-25 c.M. lata.
„ 31, „ 1, after No. 10483, add; ACHMAD No. 1013; 1074; 1545; 1702.
„ 32, „ 36, instead of **angustifolira**, read **angustifolia**.
„ 34, „ 42, after *0.7, add* c.M.
„ 34, „ 54, before *a, add* 61.
„ 34, „ 54, instead of **P. wrayi**, read **P. Wrayi**.
„ 35, „ 26, „ „ *0.1-15* , „ 0.1-0.15.
„ 35, „ 45, instead of $^1/_2$, *read* $^1/_4$.
„ 37, „ 24, „ „ ZOLLINER, „ ZOLLINGER.
„ 39, „ 7, from beneath, instead of singo, read signo.
„ 40, „ 7, instead of *Subglabra*, read *subglabra*.
„ 42, „ 13 14, „ „ *P.* , „ **P.*

Page 47, line (s) 10, instead of *P. philippinensis*, read *V. philippinensis.*
„ 47, „ 18, „ „ **Philippinensis**, „ **philippinensis.**
„ 49, „ 26, „ „ *3-11* , „ *8-11.*
„ 50, „ 40. „ „ *lati olia* , „ *latifolia.*
„ 50, „ 50, „ „ 8.0-1 , „ 0.8-1.
„ 51, „ 7, „ „ TEYSMAN , „ TEYSMANN.
„ 51, „ 21, „ „ *pnnctats* , „ *punctata.*
„ 52, „ 25, „ „ exp. (NIEUWENHUIS), read (exp. NIEUWENHUIS).
„ 53, „ 45, „ „ ey , read ex.
„ 53, „ 46, „ „ *inaequiolia* , „ *inaequifolia*
„ 54, „ 13, after 1467, add 1497.
„ 54, „ 37, „ Java!, „ Sumatra!
„ 55, „ 44, instead of DEFS., read DESF.
„ 57, „ 4, „ „ *V. Loureirii*! HOOK., read ? *V. Loureirii* HOOK.
„ 57, „ 8, „ „ HOOK. f. , „ HALL. f.
„ 57, „ 31, „ „ NUMEZ , „ NUNEZ.
„ 58, „ 38, „ „ 57 , „ 37.
„ 59, „ 11, „ „ **medusaecaly** , „ **medusaecalyx.**
„ 59, „ 12, after brunneo-farinosae, add ramuli teretes.
„ 59, „ 20, „ $2^1/_2$-$3^1/_2$ c.M. longi, „ et diametro.
„ 59, „ 39, instead of *Glossocayx* , read *Glossocalyx.*
„ 62, „ 28, „ „ Mindadao , „ Mindanao.
„ 63, „ 27, „ „ 3-5 , „ 2-5.
„ 63, „ 37, „ „ fauco dueo , „ fauce duo.
„ 65, „ 18, after **uniflora**, add STAPF.
„ 67, „ 17, „ nervos , „ glabra.
„ 67, „ 18, omit glabra,.
„ 67, „ 40, instead of 0.35-0.58., read 0.35-0.5.
„ 68, „ 11, after Austr., add IV.
„ 68, „ 14, instead of *232*, read *223*.
„ 68, „ 23, „ „ *G. macrophylla* R. BR. BENTH., read *G. macrophylla* (R. BR.) BENTH.
„ 70, „ 20, „ „ iis , read iis e.
„ 71, „ 44, „ „ ALBERTISI., „ ALBERTISII.
„ 73, „ 14, „ „ 195 , „ 295.
„ 74, „ 6, „ „ **Incisum** , „ **incisum.**
„ 74, „ 48, „ „ *tingel* , „ *tinged.*

Page 76, number *41*, *is to be read as follows:*

41. a. Corolla-tube more than twice as long as the calyx. **41. C. buruanum.**
b. Corolla-tube less than twice as long as the calyx. *41 A.*
41. A. a. Calyx and inflorescence, also branchlets and lower surface of leaf, softly woolly; fruits wholly included by the enlarged calyx, the lobes of which are not recurved. **40. C. Cumingianum.**

b. Calyx and inflorescence, also branchlets and lower surface of leaf, minutely pubescent; fruits not wholly included by the enlarged calyx, the lobes of which are steailtely recurved. **40 A. C. Confusum.**

Page 76, line 54, instead of **paniculata,** read **paniculatum.**
„ 77, „ 25, after mss., add ¹).
„ 77, beneath at the bottom of the page, add as a note:

¹) *Named after* SAHELANGI, *a native government officer of the Minahassa, who rendered valuable services to* DR. S. H. KOORDERS, *when the latter was collecting in the district of the former.*

„ 79, line (s) 4, instead of WALL., read WALP.
„ 80, „ 1, after BAKER, add, in THIS.-DYER Flor. Trop. Afr. V. (1900) p. 308.
„ 88, „ 5, instead of *C. oetidum*, read *C. foetidum.*
„ 88, „ 15, „ „ *rosenm* , „ *roseum.*
„ 88, „ 28, „ „ **typica.**- *macradenium* MIQ. read **genuina** - *C. macradenium* MIQ.
„ 88, „ 42, „ „ *ragrans* , read *fragrans.*
„ 88, „ 43, „ „ *ragrans* , „ *fragrans.*
„ 89, „ 37, „ „ HASSC. , „ HASSK.
„ 90, „ 21.22, omit *C. confusum* HALL. f. in Med. Rijks Herb. No. 37 (1918) p. 65.—
„ 90, „ 32.33, omit June 1910;- 22055;- HALLIER No. 40; 276; KOORD. No. 41242; 41366.
„ 90, „ 44.45, between the numbers 40 and 41, add:

40A. **Clerodendrom confusum** HALL. f. in Med. Rijks Herb. No. 37 (1918) p. 65; Verb. 290.

Distribution: Java! Sumatra!

Coll. Herb. Bog.:

Java: Res. Batavia, Buitenzorg (BACKER June 1910 and No. 22055; HALLIER No. 40; 276; VAN SLOOTEN No. 560; Karimon Djawa-Isl. (KOORD. No. 41242; 41466).- Sumatra: Padang (JACOBSON No. 3013).

Page 91, line 23, omit JACOBSON No. 3013.
„ 93, „ 18, instead of *scopi erum* , read *scopiferum.*
„ 93, „ 19, „ „ *singalen e* , „ *singalense.*
„ 94, „ 37, „ „ *ellipticum* , „ *elliptifolium.*
„ 94, „ 42, „ „ (VETN.) , „ (VENT.).
„ 98, „ 13, „ „ puberula , „ subpuberula.
„ 99, „ 31, „ „ Borneo! , „ Borneo?.
„ 102, „ 4, „ „ *Upata adans,* „ *Upata* ADANS.
„ 102, „ 5, „ „ *Racka Bruce,* „ *Racka* BRUCE.
„ 103, „ 24, „ „ *Ovata* , „ *ovata.*
„ 104, „ 43, „ „ Aboina , „ Amboina.
„ 111, „ 15, „ „ **(Rob.)** , „ **(Roxb.).**

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DEPARTEMENT VAN LANDBOUW, NIJVERHEID EN HANDEL

tenzorg, Java

„'S LANDS PLANTENTUIN"
(„JARDIN BOTANIQUE DE BUITENZORG")

Bulletin du Jardin Botanique

Rédigé par les Docteurs ès Sciences Naturelles:

W. M. DOCTERS VAN LEEUWEN,
Directeur de Jardin Botanique

F. C. VON FABER,
Chef des Laboratoires Botaniques des étrangers

et

J. J. SMITH,
Chef de l'Herbarium

Série III.

Volume III. **Livraison I.**

Janvier 1921

SMITHSONIAN INSTITUTION
FEB 9 1926
NATIONAL MUSEUM

ARCHIPEL DRUKKERIJ-BUITENZORG.

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B92

DEPARTEMENT VAN LANDBOUW, NIJVERHEID EN HANDEL

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ARCHIPEL DRUKKERIJ-BUITENZORG.

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MYKOLOGISCHE MITTEILUNGEN I.

von

ERNST GÄUMANN.

Unter diesem Titel sollen in der Folgezeit eine Anzahl Beschreibungen neuer Arten oder Revisionen bereits beschriebener Arten erscheinen, und zwar in zwangsloser Reihenfolge, wie sie eine vielfach unterbrochene Beschäftigung mit der Pilzflora Javas zu Tage fördert.

1. Triphagmium Trevesiae n. sp.

Aus dem Urwald von Tjibodas ist bereits von *Raciborski* ein Triphagmium auf einem nicht näher bestimmten Heptapleurum notiert worden, das er zu Triphagmium Thwaitesii Berk et Br. stellt. Ich fand ein offenbar mit diesem identisches Triphagmium auf Schefflera polybotryum, dessen Dimensionen mit der Beschreibung, die *Hennings* (1900, p. 3) nach Exemplaren auf Heptapleurum ellipticum aus dem Botanischen Garten Buitenzorg verfasst hat, übereinstimmen. Eine Abbildung dieser Form ist in Fig. 2 gegeben.

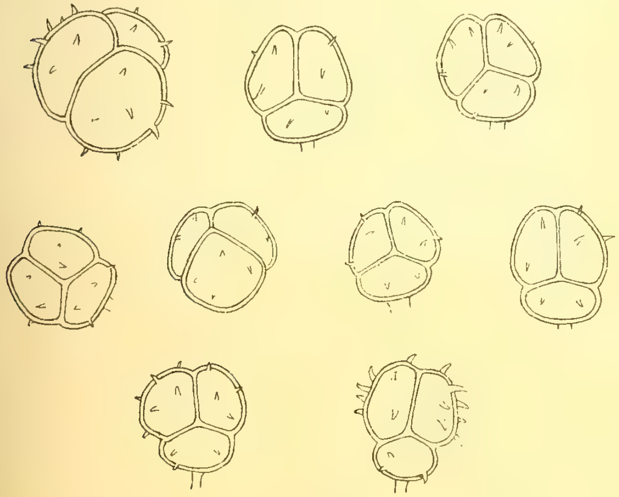

Fig 1. Teutosporen des Triphagmium Trevesiae n. sp. (Vergr. cc. 525 ×).

Daneben tritt in Tjibodas noch auf einer andern Araliacee ein Triphagmium auf, nämlich auf Trevesia sundaica Miq. Das Krankheitsbild ist wesentlich dasselbe wie bei Schefflera. Unter dem Einfluss des Pilzes wird einerseits ein Teil des Chlorophylls zerstört, es entstehen erst hellgrüne, dann schliesslich braune Flecken, andererseits tritt eine schwache Hypertrophie ein, sodass das befallene Blattstück sich galottenförmig vorwölbt. Auf der Unterseite dieser deformierten Partien findet sich der Pilz als braunschwarze pulverige Masse.

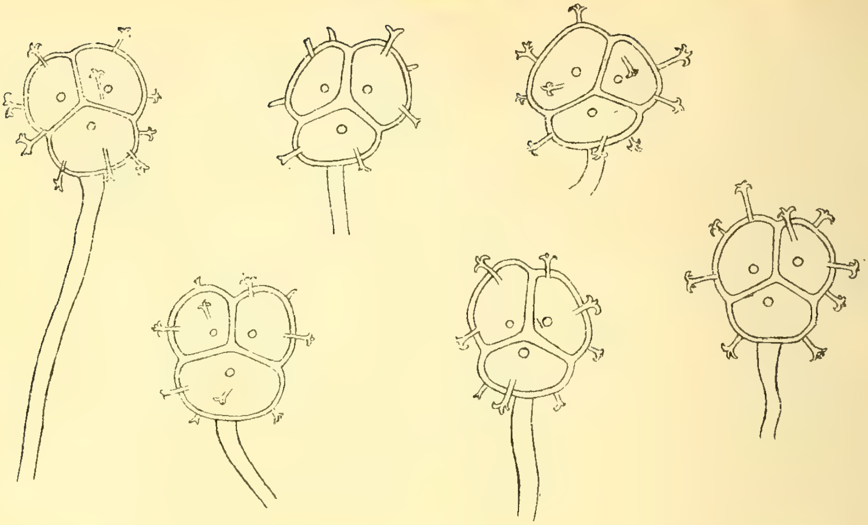

Fig. 2. Teleutosporen des Triphagmium Thwaitesii auf Schefflera polybotryum (Vergr. cc. 525 ×).

Wie bei Triphagmium Thwaitesii, so sind auch bei unserer Form nur Teleutosporen zu finden. Diese erinnern aber merkwürdigerweise in ihrem Aussehen nicht an die andere Araliaceen-bewohnende Form, sondern an das Triphagmium echinulatum Lév. auf Umbelliferen (Fig. 1). Auch hinsichtlich der Dimensionen weicht sie von Triphagmium Thwaitesii merklich ab, indem ihre Länge nur 18-25 μ beträgt, auf Schefflera polybotryum dagegen 30-44 μ. *Hennings* fand seinerseits bei der Form auf Heptapleurum ellipticum 24-30 μ. Es steht daher ausser Zweifel, dass unsere Form von jener specifisch verschieden ist und als neue Art aufgefasst werden muss. Im übrigen hat bereits *von Höhnel* in der Zeitschrift für Gährungsphysiologie (I, 1912, p. 227) auf diese Form als einer Nachuntersuchung bedürftig hingewiesen.

Triphagmium Trevesiae n. sp. Soris teleutosporiferis amphigenis, maculis fuscis decoloribus saepe in vivo bullatis insidentibus, minutis, sed in greges magnos usque 2-3 cm. diam. dense aggregatis et confluentibus, pulverulentis, atris; teleutosporis ambitu subglobosis usque piriformibus, 3-cellularibus, obscure brunneis, opacis, processuibus 15-25 usque ad 3 μ longis obsitis, 18-25 μ longis, 11-20 μ latis; pedicello hyalino, persistenti, 5-25 μ longo, 4-7 μ crasso. Habitat in foliis vivis Trevesiae sundaicae *Miq.* in insula Java Indiae.

2. Gloeosporium tremellinum n. sp.

Auf dem Gipfel des Pangerango sind die Blätter einiger Sträucher von Photinia Notoniana Wight et Arn. auf der Unterseite über und über mit kleinen braunroten bis dunkel karminroten Flecken bedeckt. Zu Beginn der Regenzeit springen diese spaltförmig auf und lassen eine ockergelbe, gallertige Masse heraustreten. Diese verliert schon nach zwei bis drei Tagen ihre leuchtende Farbe, fällt in sich zusammen und der umgebende Fleck nimmt eine schmutzigbraune oder braunviolette Färbung an.

Die Ursache dieser Krankheit ist ein Pilz, den ich trotz mancher Bedenken vorläufig bei der Gattung Gloeosporium unterbringen möchte. Ein Teil eines Querchnittes durch ein junges Stroma findet sich in Fig. 3. Wie man sieht, wird das Lager einige Zellschichten tief unter der Epidermis angelegt und drückt dann in der Folge der Entwicklung die darüber liegenden Gewebepartien zusammen. Die ausserordentlich stark verdickte Epidermis leistet diesem Druck wohl am längsten Widerstand, sodass das Stroma erst in Reifezustand nach aussen treten kann. Als mechanische Kraft kommt dabei neben dem normalen Wachstumsprocess ein leichtes Verquellen der Membranen und vor allem der Conidienstiele in Betracht, was sich an Mikrotompräparaten durch die ungleiche Speicherung von Gentianaviolett deutlich nachweisen lässt. Diese Verquellung beginnt in den obersten Lagen und schreitet basalwärts fort.

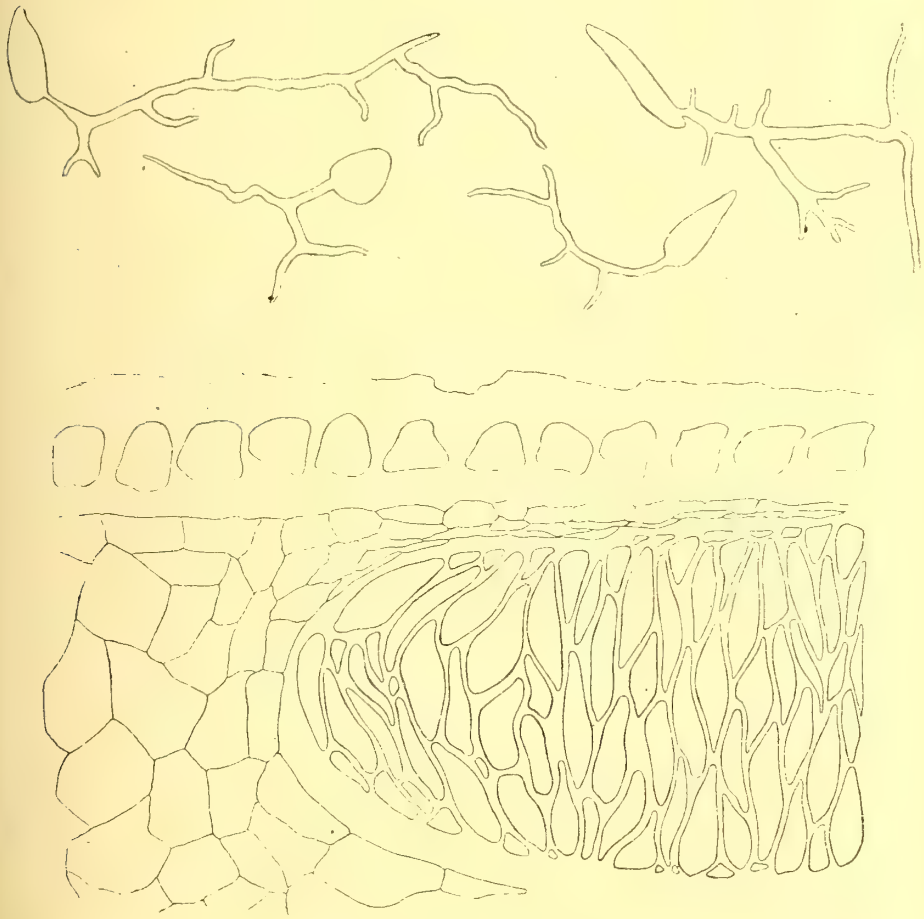

Fig. 3. Gloeosporium tremellinum auf Photinia Notoniana. Oben Keimende Conidien (Vergr. cc. 300 ×). Unten Durchschnitt durch ein junges Stroma (Vergr. cc. 525 ×).

Die Conidien werden einzeln auf einem langen Stiele gebildet und sind in ihrer Form unregelmässig spindelförmig (Fig. 3), durchschnittlich 20-35 μ lang, 10-16 μ breit. Ihre Länge ist aber ausserordentlich variabel. Die Membran ist hyalin; dagegen besitzt der Zellinhalt eine leuchtend goldgelbe Farbe, die an Chroolepidaceen erinnert. Die Keimung erfolgt in normaler Weise durch Keimschläuche, die sich in Nährlösungen rasch und reichlich verzweigen (Fig. 3).

Die Unsicherheit der systematischen Stellung dieses Pilzes habe ich schon oben angedeutet. Dem Habitus seiner Sporenlager und seiner Farbe nach steht er der Gattung Hainesia ausserordentlich nahe, welche Beziehung auch dadurch unterstützt wird, dass auf einer andern Rosacee, nämlich auf Rubus, bereits eine Hainesia Rubi Sacc. beschrieben worden ist. Dagegen unterscheidet er sich von ihr durch die unverzweigten Conidienträger mit nur endständigen Sporen. Es bleibt daher nichts anderes übrig als unseren Pilz provisorisch zu den Gloeosporien zu stellen, wo er allerdings in Folge der gallertigen Beschaffenheit seiner Stromata und der Färbung des Zellinhaltes ziemlich isoliert stehen dürfte. Möglicherweise wird man für ihn später eine besondere Gattung errichten müssen.

Gloeosporium (?) tremellinum n. sp. Acervulis (Fig. 3) in macula arescendo rubro-ochroleuca, latissime fusco- vel nigro-brunneo marginata subcuticularibus, hypophyllis, rarius epiphyllis, saturate flavis; conidiis 12-55, fere 20-35 μ longis, 7-25, fere 10-16 μ latis (Fig. 3), singulis in conidiophoris nascentibus, irregularibus. Habitat in foliis vivis Photiniae Notonianae Wight et Arn. (Rosacearum spec.) in monte Pangerango insulae Java Indiae.

3. Ueber Hamaspora gedeana Rac.

Von *Raciborski* wird 1909, p. 275 auf Rubus alpestris vom Weg zwischen Tjibodas und dem Gedeh eine Hamaspora gedeana (Phragmidium gedeanum *(Rac.) Sacc. et Trott.)* beschrieben, von der die Originalexemplare weder in Europa noch hier in Buitenzorg vorhanden sind. Wahrscheinlich sind sie durch ein Versehen verloren gegangen.

Nach *Raciborski* unterscheidet sich dieser Pilz von den übrigen Hamaspora-Arten dadurch, dass er die Teleutosporen nicht in Säulen, sondern in Häufchen bildet. „In der Form, Farbe und Beschaffenheit der Sporen zeigt er jedoch nahe Verwandschaft zu den übrigen Species. Die mittleren Teleutosporen-Zellen sind gewöhnlich so lang wie breit, die oberste Zelle ist spitz und in ein kurzes membranöses Stachelchen von 20 μ Länge ausgezogen. Die Basidien sind gerade, vierzellig. Die Basidiosporen oval, bis 10 μ lang und 9 bis 10 μ breit."

Der nach *Raciborski* so eigenartige Habitus des Pilzes, auf den *Sydow* (1915, p. 81) noch besonders hinweist, veranlasste mich, auf diese Hamaspora zu fahnden. Sie ist wirklich am Aufstieg zum Gedeh noch auf Rubus alpestris zu finden, nämlich an einem Bachübergang oberhalb der heissen Quellen, wo die letzte Steigung nach Kandang Badak zu beginnt. Sporenform (Fig. 4) und Sporengrösse stimmen vollständig mit den Angaben von *Raciborski* überein. Dagegen kann seine Bemerkung, dass die Teleutosporen nur in Häufchen entstehen und nicht in Säulen, nicht aufrecht erhalten werden. Das makroskopische Bild ist vielmehr vollständig dasselbe wie bei den andern Hamaspora-Arten: Hamaspora gedeana bildet durchaus normale Teleutosporensäulchen, die erst an der Spitze auskeimen und dann dort farblos werden. Aus diesem Grunde sind sie vielleicht von *Raciborski*, der seine Beschreibung wohl nach getrocknetem Material verfasst hat, übersehen worden.

Es fragt sich nun, ob die Hamaspora gedeana doch als eigene Art beibehalten werden darf. Wegen Mangel an Vergleichsmaterial ist es nicht möglich, diese Frage hier in Buitenzorg zu lösen. Ihrer Form nach stimmt die Ham. gedeana vollständig mit der Ham. longissima (*Thuem.*) *Koern.* überein, wie sie von *Dietel* (1900, Fig. 47 E) abgebildet wird. Dagegen sind ihre Sporen länger und stärker septiert. Auch fehlt ihr die Uredogeneration.

Auch die *Hamaspora acutissima Syd.* kann kaum mit ihr vereinigt werden, da die Sporen der *Sydow*'schen Art (1915, Tab. IV, Fig. 41) schärfer gegen den Stiel abgesetzt sind und spitzer auslaufen.

Es scheint mir daher gegeben, die systematische Stellung der *Raciborski*'schen Art vorläufig nicht zu verändern, obschon sich ihr am meisten charakteristisches Merkmal als irrtümlich herausgestellt hat.

Dagegen möchte ich hier auf eine Eigentümlichkeit in der Art der Keimung hinweisen. Bringt man die Teleutosporen in schwache Nährlösungen, z. B. Quellwasser mit 0,5% Pepton, so beginnen schon nach 6 Stunden die ersten Basidien aufzutreten. Zuerst keimt die apicale Zelle, dann schreitet der Process nach unten fort. (Fig. 4). Haben die Basidien eine gewisse Länge erreicht, so schnüren sie durch eine Querwand eine Gipfelzelle ab, welche sich bald abrundet. Dann wird eine zweite Zelle abgeschnürt, dann eine dritte. Mehr als drei Zellen waren nie aufzufinden. Dagegen kommt es vor, dass nur eine einzige oder nur zwei Zellen abgeschnürt werden. Erleidet das Präparat keine Erschütterungen, so bleiben die abgeschnürten Zellen gewöhnlich aneinander hängen und geben unter Umständen zu Bildern Anlass, die einem Cystopus ähnlich sehen, nur dass die sterile Zwischenzelle fehlt. Bei der geringsten Erschütterung fällt dagegen die Sporenkette auseinander und die einzelnen Sporen liegen regellos im Präparat umher. Ihre Form ist aus Fig. 4 ersichtlich. Ihre Grösse beträgt im Durchschnttt 14 bis 15 μ für die Länge und bis 14 μ für die Breite. Ohne weiter anzuschwellen, setzen diese abgefallenen Promycelsporen ihre Entwicklung in normaler Weise durch einen Keimschlauch fort.

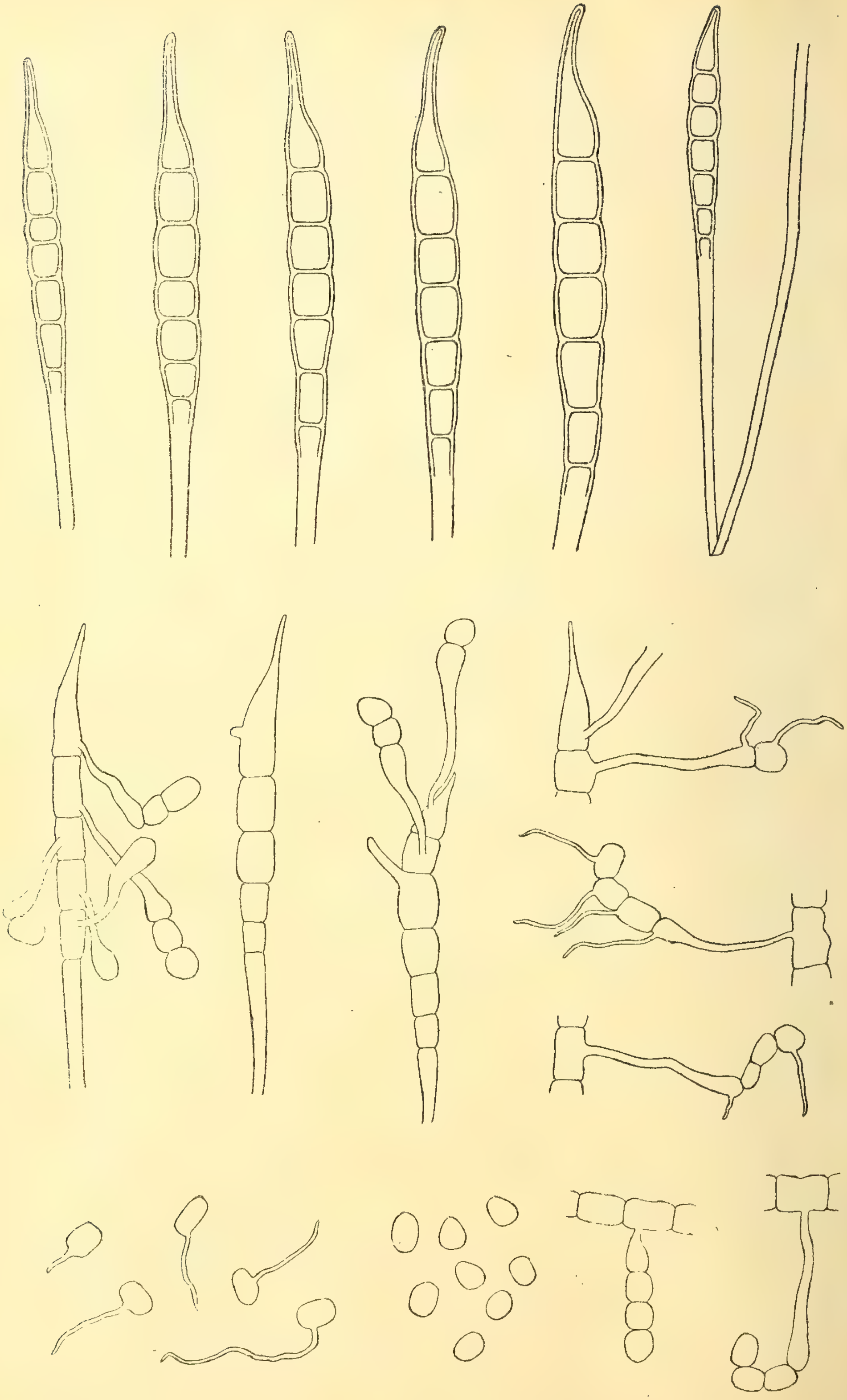

Fig. 4. Hamaspora gedeana auf Rubus alpestris. Oben Teleutosporen. In der Mitte und unten: Keimende Teleutosporen, Basidien, Promycelsporen und keimende Promycelsporen. (Vergr. cc. 300 ×)

Dieses Verhalten legt eine Bemerkung hinsichtlich der Nomenklatur des Generations- resp. Kernphasenwechsels nahe. Man ist ja allgemein geneigt, und gewiss mit Recht, die Basidien als Gonotokonten aufzufassen. Als Tetracyten bezeichnet man dann die Sporidien resp. Basidiosporen. Streng genommen sind sie es aber nicht, sondern Tetracyten sind die vier Basidienzellen, die dann freilich in der Regel fructivicatif auskeimen und der Basidiospore den Ursprung geben. Diese fructivicative Keimung kann aber, wie unser Versuch zeigt, hintenan gehalten werden.

Nun ist freilich wahr, dass diese ungewöhnliche Keimungsweise nur künstlich in Nährlösungen erzeugt wurde. Wenn aber die Sporen potentiell im Stande sind, auf diese Weise zu keimen, so können sie es eben auch in der freien Natur tun, und dieser Fall hat sicher in einem nomenklatorischen System Berücksichtigung zu finden. Auch würde sich das Verhalten einiger Ustilagineen auf diese Weise besser dem System einordnen lassen.

4. Ravenelia Erythrinae n. sp.

Im Cultuurtuin zu Buitenzorg trat in der Trockenzeit 1920 auf Erythrina velutina, die aus Amerika eingeführt worden war, eine Ravenelia auf, die merkbaren Schaden anrichtete. Die Blätter waren über und über mit kleinen braunen Flecken bedeckt und fielen vorzeitig ab. Inmitten dieser Flecken fanden sich als feine, schwer sichtbare, bräunliche Punkte die Conidienträger einer Ravenelia.

Nun ist von *Spegazzini* aus Argentinien auf Erythrina cristaegalli eine Ravenelia platensis beschrieben worden, die aber, abgesehen von den ganz andern Dimensionen ihrer Teleutosporen, schon deshalb nicht mit unserer Form identisch sein kann, weil die Oberfläche ihrer Teleutosporen glatt ist, diejenige unserer Sporen aber mit feinen Vorsprüngen besetzt. Da eine andere Ravenelia-Art auf Erythrina noch nicht bekannt ist, muss unsere Form als neue Art aufgefasst werden, für die ich folgende Fassung vorschlage:

Ravenelia Erythrinae n. sp. Soris teleutosporiferis in maculis foliarum insitis, difficile visibilibus, fuscis; capitulis teleutosporarum applanato-hemisphaericis, 80 bis 125 μ diam., dilute castaneo-brunneis; sporis papillis minimis obsitis, 23—30 μ altis, 19—22 μ latis; cystidiis eodem numero quo sporis singulis radiatim dispositis, ovatis. Habitat in foliis vivis Erythrinae velutinae in Hort oecon. Bogoriensi in insula Java.

Citierte Literatur.

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Raciborski, M. 1900. Parasitische Algen und Pilze Javas. I-III. (Batavia).

Raciborski, M. 1909. Ueber einige javanische Uredineae. (Bull. Acad. Sc. Cracovie, Cl. II. p. 266-280).

Sydow P. und H. 1915. Monographia Uredinearum III. (Lipsiae).

NICOLAIA HORAN.

Description of new and interesting species

by

TH. VALETON.

(With 6 plates).

Species male cognita.

Nicolaia anthodioides (T. et B.) VAL.-- *Elettaria* T. et B. (1853) p. 393.---Comp. *N. sanguinea* VAL. lc.

„Folia petiolata oblonga acuminata basi rotundata interdum subcordata supra lucida utrinque glabra marginibus ciliolatis. Ligula glabra. (TEYSMANN sub *E. Diep.*). Spicae breviter pedunculatae („brevibus elevatis" sic.), subobovatae dense imbricatae, bracteae exteriores late ovatae rotundatae mucronulatae albido-roseae, labello rubro luteo-marginatae."

„Caulis ± 2.5 M. Folia 600 mm × 40 mm. Petiolus 20 mm. Scapus 200 mm. altus." T. et B. l. c.

Distribution.

Java (an potius Sumatra?); in pago Tapos. (TEYSMANN; nom. malay.: *Honje boeoet*) (boeoet= squirrel).

This species is still mysterious. It is not mentioned by K. SCHUMANN. So there evidently does not exist a specimen authenticum neither in Kew nor in Leyde. The auth. specimen in the Buitenzorg herb. (seen by K. SCHUMANN) consist of a few much damaged spikes (cupuliform heads) and seven leaves belonging to *Nicolaia Diepenhorstii.*

According to the authors (T. et B. l.c. 1862, 326) the leaves are not undulate, the ligula and petiole are glabrous, the leaves are green, the shape of the flowerhead is somewhat different from that of *N. Diepenhorstii.* The name has only a historical value. RIDLEY thinks it to be a synonym of *Nicolaia speciosa.*

Nicolaia atropurpurea (T. et B.!) VAL.—*Elettaria* T. et B.! (1862) 327.—*Phaeomeria* Lindl. K. SCH. (1904) 266.--- *Phrynium obscurum* (non T. et B.) BINN. msc. in Herb. bog. (Tab. 1).

„Elettaria foliis lanceolatis, acuminatis, undulatis, ciliolatis, basi rotundatis, subcordatisve, in petiolum decurrentibus, petiolus glaber supra canaliculatus, subtus rotundatus, bracteis exterioribus atropurpureis viride marginatis, capsulis trigonis acutis aureo-pilosis."

„Caulis trimetralis. Folia 600 mm. longa, 90 lata. Scapus 400 mm. longus „squamis 60 mm. latis." (T. et B. l. c.)

Distribution.
Sumatra: Palembang leg. TEYSMANN, cult. in H. Bog. XI B, IV, 80.
Java: In pagis prope Bzg. an efferata? (N. ind. *honje idjoe*).

Robust herb. about 4---5 M. tall. Leaves from the youngest to the eldest dark black purple at the lower surface, quite glabrous, rather coriaceous, undulate. Ligula shorter than petiole, coriaceous, subtruncate and a little recurved at the top (in sicco).

Spike obovate involucre cupuliform. Peduncle 250---500 mm. long dark green (303---304) velvety. Internodes not quite covered by the dark brown rounded and mucronate scales.

The involucrum consists of about 7 stiff erect rounded mucronate atropurpureous, green edged bracts, with somewhat incurved edges.

In the young spikes the stiff erect involucral bracts are much longer than the flowerbuds and so form a room above the buds which on wet days is filled with water. The adult buds and flowers are projected a little beyond the involucre. The outer fertile bracts are quite resembling the sterile ones, orbicular-ovate (60 × 50). The inner bracts are diminishing gradually in size. Torus not very convex not much prolonged during the flowertime.

Bracteoles 24 × 15, linear truncate with 2 red fleshy ribs. Calyx 37 mm. long almost as long as the flower ending in 3 subulate equal erect green teeth. Corolla 40 mm. long. Coroll tube 15 mm. Dorsal petal 25 × 6 terminated by a very acute, hollow green acumen, much longer than the stamen, about as long as the calyx; anterior petals erect acute a little shorter. Lip a little longer than the calyx 25 × 17 (explanated), tip obtuse rounded, lip dark red, with a 2 mm. broad yellow border. The stylodes connate into a hemicylindrical fleshy disc, bipartite to the base, crenulate at the top 4 mm. tall 2 mm. wide.

Fruit head globose, axis not elongate. Mean size 70 × 90. Capsules obovoid, laterally compressed and more or less 4- or 5-angulate, not much longer than wide (30 × 22), with a blunt top, crowned by the short remnants of the calyx, sordid olive-green when ripe, never coloring red.

Plate 1.

Fig. 1. Inflorescence with part of scape, n.s.— Fig. 2. Young inflorescence, n.s.— Fig. 3. Same seen from above, n.s.

Nicolaia Diepenhorstii (T. et B.!).— *Elettaria* T. et B. (1862) 326.— *Phaeomeria* K. SCH. (1904) 265.

„Elettaria foliis breviter petiolatis, oblongis undulatis, ciliolatis acuminatis, subcordatisve, utrinque glabris subtus rubentibus dein virescentibus, ligulis dorso et petiolo antice rubro-tomentosis; scapis elevatis, spicis brevibus, late obovatis, dense imbricatis, bracteis late ovatis, rotundatis, apiculatis; labello rotundato, luteo-marginato, stigmate inaequali-pentagono." (T. et B. l.c.)

Distribution.
Sumatra: Priaman. (leg. TEYSM.!)

The species was described by SCHUMANN from the original [1]) specimen in the Kew-herbarium, from a cultivated plant in the Hort. Bog. In Buitenzorg it has been lost before 1903 and the label was placed by a rather different species of the same genus, of unknown origin; but in the Herbarium a fine fruiting specimen is existing.

It is easily to be recognized by the villous ligula and petiolus, the glabrous leaves, reddish brown at the backside while young, afterwards green, and the obovate long acuminate fruits. The flowers are as yet unknown, but the inflorescence is probably much resembling that of *N. atropurpurea* but differently colored.

There is a specimen in the Buitenzorg Herbarium, collected bij BÜNNEMEIJER no. 154 on mnt Taloe ± 800 M. in Padang not very far from the original locality of the species, agreeing with the description by the leaves, ligula and obovate inflorescence, but fruits were never found, though the species is common and so the identification remains dubious.

Nicolaia gracilis VAL. n. sp. male cognita.

Caulis 2---3 M. altus ± 20 mm. crassus. Folia brevissime petiolata, oblongo- et lineari-lanceolata, 360---500 mm. longa, 80---120 mm. lata in apice caulis 320 × 46 acute acuminata (acumen 15---20 mm.) basi attenuata acuta decurrentia, chartacea, in sicco utrinque grisea, supra glabra, secus marginem et subtus appresse puberula (haud ciliata), acumine sericeo, basi acuta decurrente. Petiolus 5---8 mm. longus applanatus. Ligula lata truncata ± 8 mm. longa, sub lente valida dorso sericea glabrescens. Vaginae striatae.

Flores valde iuveniles omnibus partibus villosi. Inflorescentia nunc 35 × 35 mm. cupuliformis apice convexo. Bracteae involucrantes dense sericeo-tomentosae obovatae apice spinulosae, margine membranaceae.

Syncarpia pro genere parva, 50 mm. diam, globosa, longe graciliter pedunculata. Scapus 540 × 5 mm. internodiis valde elongatis. Squamae vaginantes internodiis duplo vel quadruplo breviores 50 × 15 obtusae. Bracteae externae ellipticae, 35 mm. longae pallide sericeo-tomentosae. Capsulae globoso-obovatae pressione subangulatae apice applanatae vel truncatae, medio leviter incrassatae (22 × 18), sericeo-tomentellae, calyce tomentello coronatae. Bracteae florales obovatae capsulis longiores, 30 mm. longae persistentes obovatae obtusae sericeae.

Distribution.

Sumatra: Lampong, Koetaboemi, 25 M. (coll. HEYNIANUS No. 179, fruit red, n. ind. *Ketimbah gadjah*").

Species well distinguished by its small flowers and fruits and fruit-heads with persistent sericeous flowerbracts, which are longer than the capsules, on long slender, denudate scapes and the thin pubescence of the leaves.

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[1]) It is to be observed that the determination of the specimens distributed by the Buitenzorg Herbarium earlier than 1893 never is quite to be trusted to. Those of HASSKARL are only exceptionally right, and even the labels signed by BINNENDIJK are not always certain.

Nicolaia grandiligulata (K. SCH.) VAL. n. nov.— *Amomum* K. SCH. (1899) 308.— *Phaeomeria* K. SCH. (1904) 263. (Tab. 2).

Distribution:
Sumatra: Padang in mt. Singgalang, 1700 M. (BECCARI no. 303. K. SCHUM.) Padang in mt Talamau (Ophir) 1500 M. (BÜNNEMEIJER.) no. 830 „Flowers red, yellow above, bracts red, stem 5–6 M. high). Ibid, G. Talang, 2300 M. (BUNNEMEIJER 5429. „Infl. red. fl. yellow, dorsal petal red, herb 3–4 M. tall"). Ibid G. Merapi 1100 M. (BÜNNEM. no. 4899, „fl. yellow, bracts reddish brown").

The specimen collected on the Talamau (flowers preserved in spirits, allows me to add some additions to the description of SCHUMANN 's) drawn from the specimen of BECCARI which I did not see.

The ligula of the uppermost leaves of the stem is 60—80 mm. long (40 in the orig. sp.). The reticulate sheaths are covered with crisp hairs. The adult leaves are deglabrate. The spike is obovate with a convex top. The large ovate bracts are erect and appressed with a thorny point, shorter than flowers, villous. The living flower is about 60 mm. long, the calyx a little (± 4 mm.) longer, the latter is split to above the middle, the lobe, explained 15 mm. broad, convolute, not attenuate to the top, but terminated by 4 unequal straight subulate teeth, very hairy below the top, 3—5 mm. long. The coroll tube is 40 mm. long from its båse to the base of lip and anther, and internally constricted by a hairring below the middle, for the rest glabrous. The petals are very thin linear subacute penicillate, inserted about the middle of the common tube, the longer dorsal petal reaching to the base of the anther, the two anterior ones all but to the top of the common tube. Labellum ovate about 18 mm. long and as wide at the base (if explanated). Anther 12 mm. long emarginate, connective lobes not produced. Style hairy, stylodes about 5 mm. long fleshy tubiform. Capsule not seen. The bracteole is here of a rather rigid structure a little shorter than the calyx, about half way split, dorsally compressed and bicarinate, lobe bidentate each tooth being doubled by an equally long apiculum. The flower-bracts are lanceolate (70 × 16) long acuminate as the calyx, appressed to the flower, with an erect point.

Plate 2.

Fig. 1. Flower, calyx removed, n.s.— Fig. 2. Calyx, n.s.— Fig. 3, 4, 5. Bracteole, n.s.— Fig. 6. Flower bract, n.s.— Fig. 7. Flower, without calyx and bracts, enl.— Fig. 8. Flower enveloped by calyx.— Fig. 9. Anther, enl.

Nicolaia hemisphaerica HORAN. l. c.— *Elettaria hemisphaerica* BL. En. (1827).— *Phaeomeria hemisphaerica* K. SCH. l. c. Species male cognita.

„Elettaria foliis breviter petiolatis lanceolatis acuminatis basi oblique attenuatis tenuiter ciliatis, spicis elevatis hemisphaericis, bracteis exterioribus vacuis patentibus obtusiusculis, interioribus (floralibus) linearibus acuminatis, appressis, labello obtusiusculo." (BLUME).

Distribution:

Java: Bantam in the mountains. (Nom. inc. *Honje leuweung*. (BLUME). East-Java, 150---400 M. in forest common. (ZOLLINGER, 2296)!

This species as yet unknown to the writer might be a variety of *N. speciosa*. The fruiting specimen formerly cultivated in the Bot. garden (T. et B! Cat. 1866) resembles it, and so does a specimen the Herbarium owes to Mr. KOORDERS, given by Mr. RIDLEY, cultivated in the Singapore garden. A badly preserved specimen collected in East-Java by ZOLLINGER and distributed with this name is however certainly different, the slender peduncle sericeo-tomentose at its upper end, is very conspicuous, the leaves are ciliate. The first named character is mentioned by SCHUMANN, not by BLUME, the second one by BLUME. This specimen is the only one of a *Nicolaia* collected in East-Java, represented in our Herbarium.

The name *hemisphaerica* pointing to the shape of the inflorescence is rather ambiguous. One may have in mind a halfsphere either with the convex side upward or downward. The first case we find in *N. speciosa* BL. and it is formed by the patent exterior bracts and the conical or hemisphaerical centralpart. The latter case is found in *Nicolaia atropurpurea*. Evidently the former explication is meant by BLUME, so the species must be near to *N. speciosa* BL.

Nicolaia Heyniana VAL. n. sp. (Tab. 3.)

Herba elata, 4 m. alta, glabra. Caulis ± 25 mm. crassus.

Folia magna, nunc 650×170, (herba nondum adulta), subsessilia (pet. 3---5 mm.) late oblonga, apice obtusa, breviter apiculata, basi subrotundata glaberrima, crasse membranacea margine minutissime pilosulo-ciliata, albida vel rubra, in vivo odorem penetrantem *Nicolaiae speciosae* erhalantia in sicco supra grisea subtus avellanea.

Ligula ovata apice truncata, angulis rotundatis, summo apice minute pilosula, dorso ad insertionem petioli tuberculata, 15 mm. longa in vivo rubra in sicco nervosula. Vaginae striulatae.

Inflorescentia capitata, ovata vel elliptica, subfusiformis, toro parvo brevi (in statu florente), pedunculo brevi semper curvato. Squamae pedunculares in bracteas involucrales transeuntes bifariae subunilaterales, imbricatae obovato-oblongae apice rotundatae et obcordatae in sinu mucronatae, sub. rigidae glaberrimae, in vivo rubrae, bracteae externae cucullato-apiculatae, 65 × 30. Bracteae florales oblongae 55 × 20 — 50 × 10. Flores sessiles numerosi aequilongi bracteis arcte inclusi modo *Hornstedtiae* labello tantum exserto. Bracteola mox spathaceo-fissa lobo acuto minute 3-dentato vel apice bifido.

Calyx apice obtusus minute 3-dentatus. Petala linearia subaequalia apice subtruncata 25 × 4---5. Tubus communis ± 30 mm. longus. Labellum auriculis magnis rotundatis convolutis, explanatum rhomboideum 15 × 15 in limbum (appendiculum K. SCH.) ellipticum ipso fere aequilongum 10 mm. latum in vivo crispulo-marginatum productum.

Filam. 7 mm. anthera 10 mm. Thecae apice subdivaricatae connectivo emarginato. Stigma generis; ovarium sericeum; stylus glaber, stigma disciforme antice ostiolo transverso dorso gibbo in structum.

Nectarium bipartitum, cylindricum apice crenulatum 4 mm. longum. Fructus ignotus.

Distribution.

Java: Batavia, Sentiong, in colli sepulcrali. Semel visa. Patria ignota. (Leg. HEYNE. „Inflorescence and flowers red, labellum yellowedged")· Whole herb strongly smelling (smell of *N. spicata* and other species the genus.)

This species though by the flowers most certainly belonging to the genus is very curious by the fusiform inflorescences remembering those of *Hornstedtia* species. By the somewhat prolongated top of the lip it reminds some species of *Achasma*.

Plate 3.

Fig. 1. Inflorescentia speciminis minoris, n. s.— Fig. 2. Flower with bracteole and calyx, n.s.— Fig. 3. Bracteole laid open, n.s.— Fig. 4. Calyx from inside, n.s.— Fig. 5. Lip seen from top (auricles of the basal part too small), n.s.— Fig. 6. Flower laid open showing the rhombiform outline of the lip's main part, n.s.— Fig. 7. Nectarium, enl.— Fig. 8. Stigma from face, enl.— Fig. 9. and 10. Stamen, enl.

Nicolaia intermedia VAL.—Comp. *N. hemisphaerica* BL.? l.c. 57.(Tab. 4.)

Folia lanceolato-oblonga et linearia, 370 × 60 — 560 × 85, inferiora 250 × 60, acute acuminata basi acuminata et in petiolum decurrentia, tenuiter chartacea glabra, margine inconspicue appresso ciliolata in sicco grisee vel olivaceo. Petiolus 5---10 mm. longus gracilis. Ligula petiolum aequans oblonga apice rotundata, tenuis, glabra apice ciliolata. Vagina glabra nervoso-striulata. Inflorescentia late cupuliformis vel patelliformis, centro conico 130 mm. diam., 60---70 alta. Torus conicus 40 × 30 per anthesin vix accrescens. Scapus elongatus 200---800 mm. × 10, glaber. Squamae longae et longissimae apice imbricatae, scapum haud denudantes (90---160 mm. longae), duae ultimae capitulo applicatae. Bracteae involucrantes externae in cyclum singulum dispositae erecto patulae hic inde patentes apice recurvae et patentes, ellipticae obtusae apiculatae, ± 8 steriles; bracteae florales exteriores ascendentes, ceteras cum floribus involucrantes ± 8, sterilibus externis multo breviores apice rotundatae, versus centrum spicae bracteae sensim decrescentes floribus aequilongae. Flores iis *N. speciosae* sat similes sed breviores ± 48 mm. incurvi. Bracteola 22 × 15 (explanata) biloba obis brevissimis subtruncatis. Calyx 30—15 acute 3-dentatus dentibus binis subconnatis. Corolla 35 mm., lobo dorsali erecto acuto antheram et calycem longe superante. Labellum rhomboideum cum tubo 42 mm. 16 m. latum, apertura labelli post dorsum antherae haud clausum, of Annulus in medio tubo haud incrassatus, e pilis parcis laxis consistens, filamentum intus pilosum, anthera brevior. Stylus pilosus stylodia 4---5 mm. longa. Bacca obconica ± 6-angulata apice rotundata, calyce marcescente coronato, sericeo-tomentosa (35 × 25). Syncarpium 100 × 80.

Distribution:

Java: Cultiv. in Hort. Bog. XI B, IV, 101. Origin unknown, Java?

The length of the scape varies from 200---500---800 mm., diam. 25 at the base, 14 in the middle in the living plant. Scales about 100 × 45, bright pink with a green mucro below the tip, the two uppermost appressed to the spike and as long. Diam. of spike about 130 or smaller length 60---70. Torus conical short not much lengthened after flowertime, 40 × 30. Involucral bracts (and uppermost scales of the scape) elliptical obtuse 100 × 60 — 120 × 70, ascending, their upper half patent and a little recurved, numbering about 10; dark red (eod. 1, 2, 6) not purple. Outer flowering bracts about 8 ascendent, tip rounded patent, much smaller than the sterile bracts, (70 × 36). Bracts of following cycle about 20, about 50 × 8, tips recurved, diminishing to the centre to 40 × 15, 35 × 7, the innermost 30 × 5. All pure red with a white marge. By the involucral bracts which are ascending and only more or less patent in their upper half, forming a single series and the ascendent much shorter outer flower bracts the species is immediately to be distinguished from *N. magnifica* and *speciosa*. The flower which generally has the same construction differs however by the narrower lip (narrower auricles), and by the dorsal corolla lobe far projecting beyond the anther, while in *N. magnifica*-etc. the anther and the petal reach about the same length. Further the puberous constriction in the coroll tube is here wanting and only represented by sparse loose long hairs, embracing the style.

Plate 4.

Fig. 1. Inflorescence longitudinally transsected, n. s.— Fig. 2. Flower, n. s.— Fig. 3. Flower from front, n. s.— Fig. 4. Tube of the coroll showing the absence of a hairy ring, enl.— Fig. 5. Labellum flattened, enl.— Fig. 6. Calyx, n. s.— Fig. 7. Bracteole, n. s.— Fig. 8. Petal, n. s.

Nicolaia rostrata [1]) VAL. n. sp.

Herba sesquimetralis. Folia (3 tantum adsunt) modice petiolata, oblonga, apice attenuato-acuminata, basi sat obliqua altero latere rotundata, dorso molliter puberula in sicco ochraceo-grisea, costa et linea marginali in sicco densius rufo-puberula. Folia 480 × 100 vel 580 × 130 vel 630 × 105. Petiolus canaliculatus 30---35. Ligula jam novella profunde emarginata vel bifida, lobis acutis dorso albido-pilosa ipsa in sicco rubescens, parva (8 mm.). Vagina colore straminea a ligula discrepans, tenuiter costulata. Inflorescentia globoso-cupularis 40---50 mm. diam. longe pedunculata erecta vel decurva. Scapus gracilis, nunc (incompletus) 400 mm. longus 6 mm. latus. Internodia circ. 50---70 mm. longa lanuginoso-pilosa, partes denudatae glabrescentes. Squamae internodia aequantes spathaceae acutae apiculatae glabrae, summae capitulo appressae Bracteae involucrales lanceolatae longe acuminatae glabrae apice pilosulae sat laxe confertae ± 40 × 10 (in sicco).

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[1]) Name because of the long acuminate rostrate flower bracts.

Bracteae florales lanceolatae, cymbiformes apice convoluto-rostratae, subglabrae (apice excepto), flore appressae, (30---35 mm) Bracteolae compressae, lobo 3-carinato denticulato appresse villosae flore $^2/_5$ breviores. Flores parvi incurvi 40 mm. Calyx bracteis aequilongus 3-dentatus et apiculatus, dente medio minore sericeo-villosus. Petala anguste linearia acuta glabra penicillata inaequilonga. Labellum canaliforme explanatum rhomboideum apice vix producto et recurvo. Anthera apice emarginato connectivo carnoso truncato dorso subretusa. Stigma obcordatum (e vertice visum). Stylus glaber. Stylodia generis parva.

Distribution.

Sumatra: West coast, Padang in mt. Talamau (Ophir), common in light forest, at 2080 M. (leg. BÜNNEMEIJER 20809, 23/5, 1917, „flowers yellow").

This species remembers *P. chrysocalyx* by the description of the spike and flowers, but the shape of the leafbase, petiole and ligula seems to me too different to allow an identification. It is however rather strange that the collector who found this species frequently at the same locality where BECCARI collected *P. chrysocalyx* did not collect the latter species.

The species is curious by the rather loose, narrow involucral bracts all erect but not closely imbricating so as to form a complete rigid involucre as in *N. atropurpurea*. All bracts are rostrate-acuminate, the long tips of the flower bracts exserted above the coroll. In a dried state they are castaneous brown. The long exserted 3-dentate calyces very conspicuous by their yellow-sericeous indument are a little longer than the bracts, the bracteoles are little more than half as long, bicarinate like other species of the genus and also yellow-sericeous. On other mountains in the same region (Padangsche Bovenlanden) in Mt. Talang, Mt. Merapi and Mt Singgalang the collector gathered other forms showing the same type in the construction of flowers and spike and also in the whole habit but very much different by several details. The difference in the shape and hairiness of the ligula is very striking. Neither in the type specimen nor in the varieties any trace of fruit was found.

1. Var. **talangensis**. Folia longe petiolata 30---40 mm. subtus molliter lanuginosa (pilis crispis secus venulas insertis), ligula longissima (30---50 mm.) dense villoso-tomentosa. Vaginae conspicue reticulatae, fenestris angustis quadrangulis. Spica subglobosa (an potius semiglobosa) densiflora. Bracteae involucrales lanceolato-ovatae acuminatae dorso puberulae Bracteae florales rostratae, calycem superantes, interiores marcescentes? Bracteola corollae tubum aequans. Flores 30 mm. haud superantes quam in typo breviores densius villosae. Calyx haud multo longior, omnia dense flavo-sericeo-tomentosus. Rachis spicae elongata per anthesin accrescens, demum spica oblonga 140 × 45.

Distribution.

Sumatra: Padangsche Bovenlanden, mt. Talang, 2000 m., common in forest. (BÜNNEMEIJER 5298 = 5299, 5431, „bracts of spike red, flowers yellow, labellum red”).

Nicolaia Lörzingii VAL. n. sp. (Tab. 5, fig. 6—11).

Folia modice petiolata oblonga apice acuminata basi obtusa acuminata pergamacea in sicco supra fusca subtus castanea, (in vivo juniora subtus castanea), margine parce et fugaciter ciliolata (500 × 100 — 110). Petiolus crassus marginatus, 25 mm. longus, 5 latus. Ligula petiolo vix brevior obtusa glabra summo apice piloso-ciliata.

Inflorescentia longe pedunculata obovata vel subgloboso-obconica magna innumeriflora. Scapus elongatus gracilis, glaberrimus. Squamae subdistantes lanceolatae obtusissime minute sub apicem mucronatae, glabrae, binae superiores capitulo approximatae et illa appressae (in vivo 100 × 50, in sicco 70 × 25 longae), margine membranaceo, (in vivo incarnata margine albido).

Bracteae involucrales in cupulam conniventes erectae maximae (90 × 40 mm.) margine subincurvae, mucrone parvo spinoso projecto, glabrae coriaceae margine membranaceo albido. Bracteae fl. externae praecedentibus conformes; interiores angustae membranaceae apice acuto incurvae (60 × 6). Bracteola basi parte $^1/_3$ tubulosa florem arcte cingens, parte superiore spathacea tenuiter membranacea, lobo ± 10 mm. lato, apice sub-(3) denticulato vel bidentato vel subintegro, quasi rostrato, in floribus centralibus longior (25—40 mm.). Calyx tubuloso-spathaceus apice complicato acuto integro ad 8 mm. supra petala exsertus, 50 mm. longus. Corollae tubus 30—35 mm. longus, medio intus annulo incrasato villosissimo constrictus.

Petala circ. medio tubo inserta linearia apice rotundato cucullata 28 — 30 mm., calyce multo breviora. Labellum ovato-rhomboideum, auriculis rotundatis haud latis parte mediana circ. 5 mm. exserta incurva et crispula calyce brevius. Stigma generis. Stylodia semicylindrica 3 mm. longa. Ovarium elongatum sericeum.

Distribution.

Sumatra: Deli, Bandarbaroe, in forest 950 M., frequent. (LÖRZING no. 4299, 17/6, '16. „Rhizomes subterraneous spreading occupying a space of some square Meters. Stems numerous, distant, 4 M. tall. Young leaves redbrown at the lower side. Scapes about 800 mm. tall, crowded, about 20 on one stock, corallred (=incarnate), edges of the scales and outer bracts whitish. Flower bright red. labellum dark red above, internally almost black, upper border thin yellow. Connective darkred blackish at the top. Plant very strongly smelling being bruised”).

Plate 5.

Fig. 6. Adult bud, parts extracted artificially, bracteole partly explained, n. s.—

Fig. 7. Upper part of calyx, n.s.— Fig. 8. Upper part of bracteole, n.s.— Fig. 9. Labellum and stamen in their natural position, n.s.— Fig. 10. Stamen and tube, sectioned, enl.— Fig. 11. Labellum and tube with hairy ring, n.s.

2. var. **singalangensis.** Folia modice (20—25 mm) petiolata, glaberrima, nitidula, ligula petiolo brevius, (15—20 mm) apice bifido, dorso dense villoso-tomentosa in sicco flava vagina et petiolus reticulata. Spica semiglobosa demum oblonga, bracteae externae lanceolato-ovatae acuminatae, flores etc. iis var. *talangensis* simillima sed bracteae florales demum scarioso-obliterantes, earum rostro haud valde conspicua.

This var. is very near te the former one, the spikes are in the same way being elongated (130 × 60) as there, but the shorter ligula, the glabrous leaves and the obliterant flower bracts, and there the labellum is said to be red!

Distribution.

Sumatra: Padangsche Bovenlanden, mt. Singgalang 2400 M. (BÜNNEMEIJER no. 2913, 2698, „flowers yellow"). Ibid., mt. Merapi, 1850 - 1900 M. in forest at riverside. (BÜNN. no. 4596 = 5027 „flowers yellow, bracts red, peduncular bracts green").

Nicolaia solaris HORAN. l. c. 32., VAL. in Icones t. 160 (1905). *Elettaria* BL. l. c.— *Phaeomeria* K. SCH. (1904)264.

Distribution.

Java: West Java, Mt. Tjerimai, 1300 M., virginal forest. (BACKER No. 4790. „Stigma black. Flowers quite red. Labellum with a very narrow yellow edge"). Mt. Pengalengan, Taloen, 1650 M., virginal forest. (BACKER no. 26149. „Flowers red. Labellum red with orange-coloured tip. Scape 170 mm. tall.") Nirmala, 1500 M. virginal forest. (BACKER no. 10703. „Stem 3 M. long. Peduncles red 2—3 dm. Labellum red, with a yellow edge"). Mt. Salak, Pasir bogor 1000 M. (BACKER no. 9311. „Flowers red, labellum yellowedged. Bracts complicate very acute"). Mt. Gede 1500 M. (several collectors, BLUME!). Bandoeng, Tjibeureum, 1600 M, (SMITH no. 456 „flowers phoeniceous"). Central Java, Djogdjakarta, Mt. Merapi, 1000 M. (BEUMEE).

This species fully described in Icones bog. t. 160 and 161, was at that moment known only from the Mt. Gede. Since it has been colected on several West-Java mountains and also as far east as Mt. Merapi, and the specimens of various stations have proved to vary considerably in the dimensions of the flowers the shape and colour of the lip the length of calyx and bracteole. The most conspicuous variety is here described as *N. solaris* var. *aurantiaca* and pictured in our plate, below.

Nicolaia solaris HORAN. var. **aurantiaca** VAL. n. var. (*Nicolaia pallida* BL.?) (Tab. 6).

Distribution.

Java: West Java, mt. Salak, 1400 M. virg. forest. (BACKER no. 9350, *honje ngoser* (sund.) „Involucre appressed yellow-green. Labellum bright orange red. Corolla red. Anther red. Stigma red. Peduncle 0.75 M.) Mt. Salak, about 500 M. (HEYNE, *Honje warak*. „Bract et bracteola white, membranous, at last brownish. Calyx incarnate tip marcescent. Petals rose, Labellum orange. Anther and stigma red") Buitenzorg. (cult. XI B V 82).

The here described plant was collected two times on the declivities of mt. Salak, wild growing in virginal forest. It resembles the type of *Nicolaia solaris* Hor. in general aspect and in most details but differs from it by the following rather constant characteristics:

1e. In *N. solaris* the peduncle is procumbent and bent upward with its upper end, so the flowerhead is lying on the earth, in the variety the peduncle is erect more or less flexuose 150—200 mm. long.

2e. In *N. solaris* the flower bracts terminate in a 20 mm. long subulate acumen the calyx ends in 3 discrete lanceolate and mucronate teeth produced above the bud. In the variety the same but acumen only half as long, the calyx-teeth often connected.

3e. In *N. solaris* the lip is dark red with a yellow border, as in most species of this genus. In the variety the lip and inner tube are intensely orange coloured, the anther dark rose, the petals incarnate, the calyx incarnate.

Plate 6.

Fig. 1. Inflorescence, 2/3 n.s.— Fig. 2. Flower (to short) with calyx and bracteole, n.s.— Fig. 3. Flower, bracteole and upper half of calyx removed, n.s.— Fig. 4. Flower seen from top, n.s.— Fig. 5 and 6. Stamen, enl.— Fig. 7. Pistillum, n.s.— Fig. 8. Stigma, enl.— Fig. 9. Stylodes, enl.— Fig. 10. Flower explicate, n.s.— Fig. 11. Calyx, n.s.— Fig 12. Bracteole, n.s.

Nicolaia speciosa HORAN. Monogr. (1682) 32.—*Elettaria speciosa* BL. Enum. pl. Jav. (1827) p. 51.— *Alpinia magnifica* ROSC. Mon. pl. (1828) t. 75. Bot. Mag. t. 3892 --- *Amomum magnificum* BENTH. et HOOK. l. c.--- *Phaeomeria* LINDL. Introd. Nat. Syst. (1836).--- *Nicolaia imperialis* HORAN. Monogr. (1862) 32 t 1.--- *Hornstedtia imperialis* RIDL. in Journ. As. soc. Straits branch Vol XXXII (1899) 148; Mat. (1907) 40.--- *Alpinia elatior* HOOKER Journ. of Bot. I 359; JACK Mal. misc. III n. VII [1822].---*Nicolaia magnifica* K. SCH. VAL. in Bull. Inst. bot. Buitenz. (1904) No. XX p. 35.--- *Globba silvestris sulica* RUMPH. H. Amb. 6: 141.--- *Elettaria anthodioides* T. et B. teste RIDL.--- Comp *Ph. pyramidata* K. SCH. l.c.--- *N. hemisphaerica* (an BLUME?) T. et B. Cat. 1866.

Distribution.

Java: West-Java. In the hilly regions at the foot of Mt. Salak, in secundary forest. Wild and cultivated, common, many collectors. Tjiandjoer in Mt. Sangaboewana, 750 M. (BACKER no. 23757). Djasinga, near Bui-

tenzorg, Mt. Maneuh, 300 M. (BACKER no. 23470). Bantam, between Tjilorek and Moentjang 460 M. (BACKER no, 1838). Denu, Pasir Batu lawang 600 M. (BACKER no. 9045). Mt. Handjawoeng prope Buitenzorg, 700—809 M., virg. for. (BACKER no. 6090).

Sumatra: West-Sumatra, Nias (leg. V. RÖMER sine no; JACK vide loc. cit, non vidi). West Coast at Ayer Bangi [JACK l. c.] East Coast, Deli, garden of Sibolangit, in light forest, 75—700 M. very common. (LÖRZING no. 4441, 30/9 '16). „Robust herb forming 1.5—2.5 M. wide stocks of 10—50 stems; about 5 M. high, sometimes 7 M, with 5—18 scapes. Scapes 1—2.25 M. tall. Involucral bracts bright red with dark red tips white-edged. Petals hyaline with red tips, labellum dark red with a narrow, yellow border, anther dark red. Berries ripe yellow, eaten by natives". West-Coast, Padangsche Bovenl. (Mt. Ophir) Talamau, 900 M, common. BÜNNEMEIJER 275, 17/4 '17 „nom. ind. *Poear kindjoeng*, red bracts, red flowers, lip yellowbordered, stem 4—5 M").

Borneo. (leg. TEUSCHER, cult H. Bog. XIB IV 33. An species diversa?)

Ambon. (RUMPHIUS, vern. name *Sulica*).

Ceram: North coast near Wahaai. (RUTTEN no. 53 „Fl. white. nom. ind. *Salahawa*").

Celebes: Locis diversis. (SARASIN no. 693, no. 804, no. 862, teste K. SCHUMANN.)

Malacca. (culta teste RIDLEY l. c.).

Nicolaia subulicalyx VAL. n. sp. (Tab. 5, fig. 1—5).

Caulis glaber et laevis, vix striulatus. Folia breviter et crasso-petiolata, oblongo-lanceolata acuminata nunc 850 mm. longa, 90 mm. lata, petiolus vix 10 mm., supra glabra subtus cum petiolo molliter parce pubescentia ciliata. Ligula ovata petiolum aequans (5—12 mm.), apice subtruncata et summo apice parce ciliolata, cetera glabra.

Scapi ± 1 M. alte pedunculati. Ped. in sicco 10 mm. crassus haud dense sericeus. Squamae apice imbricantes, complexicaules, ellipticae oblongae acutae 85×30, striatae parce pilosulae, sub apicem (summae praesertim) longe (3—10 mm.) spinoso-mucronatae, summae 2 insertae prope basin capituli et partim amplectentes. Capitulum obconicum vel subgloboso-obconicum in vivo ad 100×60 apice convexum. Bracteae involucrantes erectae rigidae haud numerosae, capitulo breviores (90×30—40) late oblongae apice rotundatae, mucrone parvo appresso sub apicem instructae, apice villosulae et villoso-ciliatae. Bracteae florales externae praecedentibus conformes interiores lineari-oblongae subloso apiculatae, calycem aequantes flore appressae. Flores cum br. et brl. villosi. Bracteola corollae tubum aequans, apice inaequale dentatum et ciliolatum (± 45 cm.). Calyx spathaceus, 70×75 lobus 25 mm longus, explanatus 18 mm. latus aequaliter 3-dentatus, dentibus vel lobulis cucullatis et mucrone subulato-filiformi instructis, in toto 12 mm. longis, labellum fere aequans. Petala linearia apice rotundata labello paullum breviora.

Corollae tubus elongatus vix dilatatus intus villosulus, haud medio constrictus. Labellum ellipticum integrum, parte mediana paullo producta et crispulo-incurva, auriculis oblongis angustis, in vivo album apice dilute sulfurem 25×15 long Anthera sessile; connectivum profunde emarginatum, lobis supra thecas paullo projectis obtusis. Stigma generis apice trigonum, ostio magno antico, gibbo dorsali. Stylodia semicylindrica 6 mm. longa Capsula ignota.

Distribution.

West-Sumatra: Sibolangit, 700 M. in secundary forest; not rare. (LÖRZING 4342, 17/6 1916. „Robust herb, many stems (± 30), about 6 M. Inflorescences bright red (coral coloured). Flowers bright coloured (incarnate). Labellum white a pale yellow tip curled up toward the centre, stiff but the upper border membranous and irregularly folded. Connective bright red at the top, stigma darker red").

Plate 5.

Fig. 1. Flower, n. s.— Fig. 2. Flower, petals and anther made visible, n. s.— Fig. 3. Flower without calyx and bracteole, explained, n. s.— Fig. 4. Upper part of calyx, n. s.— Fig. 5. Upper part of bracteole, n. s.

RHYNCHANTHUS HOOK. F., GEANTHUS REINW. AND GEOSTACHYS RIDL.

by

TH. VALETON.

(With plates 7—8).

RHYNCHANTHUS HOOK. F.

HOOK. F. in Bot. Magaz. (1886) t. 6861; BAKER in HOOK. F. Fl. Br. Ind. VI (1890) 257. WITTMACK in Gartenfl. 48 (1899) 38, 367, 417 t. 1464.

Only two species of this genus have been hitherto described, one *Rh. longiflorus* HOOK. Bot. Mag. t. 6861, being introduced in Kew from Burma the other *Rh. Bluthianus* WITTMACK Gartenflora, t. 1468 from a not exactly known region of East-India. A third most interesting species was discovered by LÖRZING in Deli, Sumatra; indeniably belonging to this genus but much deviating by its radical multiflorous racemes and the possession of a small but not inconspicuous bipartitie labellum and of very short subulate curled staminodes immediately below the anther. By the long exserted cymbiform filament etc. it resembles wholly *Rh. Bluthianus*, which it is like also by the red flowers. The flowers are rather different when studied at the beginning of the bloom from those which are gathered at the end of it (see our fig,). In the first there is a bilamelled linear labellum erect between the petals and opposite to the equally long broad cymbiform filament. In the adult flower the part of the tube between the insertion petals and labellum is much prolongated and split open at the front, passing into the filament. It carries along the lobes of the labellum, which, crumpling up, seem to be only filiform appendices of the filament. By this posthumous growth of the coroll tube the flower resembles *Globba*. The membranaceous so called filament is constricted below the anther.

Rhynchanthus radicalis VAL. n. sp. (Tab. 7, fig. 1–6).

Rhizoma subterraneum repens 10–15 mm. crassum squamis membranaceis fugacibus. Caulis foliosus ex apice rhizomatis ortus 5–10 mm. crassus. Squamae basilares nunc tres, 75, 160 et 300 mm. longae, oblongolineares apice cordato-rotundatae et infra apicem mucrone brevi crasso

instructae, striatae et verruculis velutinis parce interpositis subreticulatae. Folia lanceolata, acute acuminata acumen (15 mm. longum), basi attenuata acuta inaequali, (420 × 80) crasse chartacea, glaberrima supra grisea, subtus pallide viridi-grisea. Petiolus brevis gracilis 10—12 mm. concavus. Ligula ovata 10 longa Vagina striata et obsolete minute reticulata.

Inflorescentia lateralis, spicato-racemosa cum scapo basi incurvo demum erecto 250 mm. longa. Pars inferior pedunculis squamis semiamplexicaulibus imbricatis acutis vestita Squamae accrescentes × 10 (infima 15 summa 35 mm. longa) dorso, sicut squamae basilares, striatae et verruculatae. Internodia glabra. Racemus (pars florifera) 140 mm. longus rachis 3 mm. crassus (in sicco). Flores subdistantes breviter (2—3 mm.) pedicellati, nunc patuli.

Bracteae parvae (8 mm.), membranaceae marcescentes apice rotundatae ciliatae. Bracteola inconspicua in apice pedicelli. Calyx tubulosus sensim dilatatus apice subaequaliter 3-dentatus, dentibus trigonis acutis, 17 (in vivo 20) mm. longus, dentes 6 mm. longi), basi et apice puberulus. Corollae tubus elongatus, calyce 1/3, demum fere duplo longior (32 mm. long.) Petala oblonga apice acuta in exsiccatis scariosa; dorsale paullum longius et latius (15 × 5). Tubus stamineus supra petalorum insertionem elongatus, in flore juvenili brevis integer, in flore adulto magis elongatus et antice fissus (cum filamento conflexens). Labellum parvum usque ad basin bipartitum petala vix superans. Lobi lineares, erecti, 10 mm. longi 1 mm lati, sibi invicem applicati, in flore juvenili filamento oppositi apice nunc scariosi Per anthesin labelli lobi tubo elongato antice fisso convehuntur et separantur, demum marcescentes ad appendicula filiformia 12 mm. longa filamento dilatato utrinque quasi adnata reducti. Stamen longum et longe exsertum in flore juvenili labello oppositum et paullo longius. Filamentum longum latissimum cymbiforme, (14 × 7) apice brevi-constrictum, parte constricta tereti 2 mm. longa, ad basin partis constrictae utrinque appendicula subulata basi dilatata minuta (2 mm. longa) instructum (staminodium). Anthera ellipsoidea, thecis contiguis utrinque rotundatis, apice vix divaricatis, connectivum membranaceum inter thecas paullum productum acutiusculum Ovarium globosum verruculosum, stylus glaber stamini aequilongum. Stigma cylindrico-cupulare, ostio terminali ciliato. Nectaria minuta (1 mm.) lobata, carnosa

Distribution.

West-Sumatra: East-Coast (Deli). Above Bandar-baroe in forest ± 1000 M., common. LÖRZING No. 5912 „Herb, rhizome subterraneous. Leafstems scattered, 2 M. high. Leaves darkgreen above, brightgreen beneath. Inflorescence lateral, scape curved at the base 200 - 300 mm. high. Bracts early marcescent, small. Calyx tubulose, lowerhalf red brown, upperhalf greenish yellow. Pedicel 6 mm. ovary 6 × 4 mm. calyx 20 mm. × 4, near the top dilated to 6 mm. Teeth of the calyx 4 and 6 mm. long. Corol scarlet, tube 35 mm. long 2.5 mm. wide, dilated above (5 mm.). Lobes about 15 mm long, lanceolate acuminate, dorsal lobe 7 mm. wide. Labellum outside scarlet inside orange coloured with scarlet stripes. Flower bilabiate, lower lip small acute, upperlip bilobed lobes connate to the filament. Stamen longer than the labellum".

Plate 7.

Fig. 1. Flower recently opened, n. s.— Fig. 2. Mature flower, n. s.— Fig. 3. Mature flower, enl.— Fig. 4. Upper part of young flower, enl.— Fig. 5. Anther with staminodes and stigma, connective covered by the stigma, enl.— Fig. 6. Inflorescence, $^{2}/_{3}$ n. s.

GEANTHUS Reinw.

Reinwardt in Blume Cat. gew. (1823). Syllogium Ratisbonense 2 (1828); Blume Enum. (1827 51 *(Geanthus,* sectie *Elettariae)* K. Schumann Pflanz. (1904) *(Geanthus* sect. *Amomi). — Geanthus* Val. in *Zingiberaceae* Deutsch Neu-Guinea in Engl. Jahrb. 52, (1914) 42.

Geanthus echinatus Val. n. sp. (Tab. 8).

Frutex 4—5 M. altus, glaber. Rhizomata digitum crassa repentia dense imbricata squamis brevibus alternantibus, radicibus aereis (haud valde elongatis) sustenta, squamae vaginantes acutae, striatae.

Caulis foliaceus erectus digitum crassus. Folia breviter haud crasse petiolata, oblongo-lanceolata basi rotundata apice acuta sensim caudato-acuminata, in sicco subpergamacea grisea, avenia, costa straminea prominente. Ligula brevissima.

Spica breviter vel brevissime pedunculata. Pedunculus squamis vaginantibus brevibus acutis coriaceis in sicco castaneis nitidis dense imbricatus. Spica capituliformis globosa bracteis late ovatis fere orbicularibus spinoso-aculeatis, concavis carnoso-coriaceis dense imbricata, omnibus florigeris. Torus parvus, ovatus.

Flores sessiles numerosissimi, incurvi, compressi, singuli bractea fauti, bracteola parva spathaceo-cymbiformi acuta calyci breviore involuti. Calyx tubulosus apice ad $^{1}/_{4}$ spathaceo-fissus, lobo spinuloso tridentato, altero dente minuto, extus sericeo-puberulus.

Corollae tubus calyce inclusus 25 mm. longus, limbus 2—3 × brevior (± 10 mm.), petalis oblongis sabaequilongis erectis. P. dorsale leviter concavum (8 × 5). Petala puberula. Labellum late oblongum marginibus incrassatis haud auriculatis, apice rotundatum petalis sublongius, apice bifido lobis rotundatis in vivo recurvo (v. f 7.) Anthera subsessilis, apice nudus leviter divaricans labello opposito et illi brevior, connectivo thecas nulla parte excedente. Thecae tomentosae.

Staminodia subulata basi hirta marginibus labelli adnata antherae ± duplo breviora, uitrinque thecae basi appressa pars libera glabra, 2 mm. longa intus glabra linea centrali dense hirsuta. Tubus intus omni parte dense velutinus, cavo angusta.

Stigma hirsutum obtrigonum, fissura linearis subapicali. Ovarium sericeo-villosum. Stylus hirtus.

Stylodia in nectarium breve truncatum subbifidum apice lobulatum et scrobiculatum stylum includens connata, 1 mm. longa.

Capsula non visa.

Distribution.

Sumatra: Mt. Ophir, Talamau, n. west declivity 1800 M., common in forest, BÜNNEMEIJER 666, 9/5-'17, „vern. name *Puar Karang*. Flowers violet, bracts red." Id, 695 13/5-'17, „vern. name *Puar sirah*. Flowers red, bracts red."

The rhizomes creeping above the earth sustented by descending roots remember *Hornstedtia pininga* and *rubra*, but the roots are covered with rootfibres, and probably no true aerial roots as in both the cited species. They are cut of at a hundred mm. from the rhizome and the section has 3—4 mm. diam. The rhizomes are invested with amplexicaul scales, that are 20 mm. long, densely imbricating, broadly ovate acute with a fine thorny mucro, thinly coriaceous, the nude parts smooth, shining, striate, not reticulate, the basal parts and the axis tomentose.

Sympodial members are present of 160 mm. length, about 12 mm. thick.

The stems are about 10 mm. thick, probably still young, for the adult stem should be 5 M. long. Leaves 260 mm. long × 65; petiole about 10—15 mm.

The spikes arise from the rhizomes near the leafstem, they consist of a short thin peduncle sensim dilated towards the globose spike; both covered by densely imbricating, broadly obovate thorny pointed convex scales, quite smooth and striate, shining, about 50—70 mm. diam, all flowerbearing. There is no real difference between the central and peripherical bracts, no involucrum.

I have reduced this species to *Geanthus* only provisorily, for by the possession of staminodes it departs from all other species of this genus, formerly described, but I am unwilling to propose a new genus before having studied more and better materials.

The inflorescence and flower are different from that of any division of the *Amomum* group though it shows some characters of all.

There is no common involucrum composed of large vacuous outer bracts, rigid and protecting the membranaceous inner flowerbearing bracts, as in *Hornstedtia*, or showy as in *Achasma* and *Nicolaia*, but all bracts are quite similar, very hard and resistant and each protecting its extremely thin and tender flower.

The flowers are small, the tube short quite connate to the filament; no faux like prolongation of the tube above the insertion of petala. The lip is calceolate with thickened edges, without auricles, such as are never wanting in any of the other groups (excepted *Euamomum*), covering and protecting the anther, it is also peculiar by being recurved.

The anther resembles most that of the *H. minor*-group of *Hornstedtia*, only the connective is very small, and narrower than the thecae themselves. The bracteole is cymbiform, open and not tubular.

The next allied form of this species seems to me *Amomum macrodon*, so called for the distinct dentiform staminodes by SCORTECHINI reduced to *Hornstedtia* by K. SCHUMANN (wrongly *macrodus)* see SCORTECHINI l. c. t. 12 with which it agrees in some important characters: Homogenous bracts short recurved, calceolate lip without auricles, subulate staminodes.

Plate 8.

Fig. I. Base of stem with rhizome, aeriel roots and inflorescences, ½ n. s.— Fig. 2. A small spike, n. s.— Fig. 3. One of the mean bracts, n. s., the outer bracts are much wider, some are orbicular.— Fig. 4. Bracteole, n. s.— Fig. 5. The same from backside, a little compressed, n. s.— Fig. 6. Flowerbud, n. s.— Fig. 7. Flower, showing the recurved labellum, n. s.— Fig. 8. Calyx, n. s.— Fig. 9. Young flower from backside, enl.— Fig. 10. Lip with the anterior petals of a quite opened but damaged flower, showing the elevated and thickened edges, enl.— Fig. 11. Back wall of the flowertube, with the sessile anther, and pistil, enl.— Fig. 12. Anther from backside, enl.— Fig. 13. Pistil, enl.—

Geanthus parvus VAL. n. sp. (Tab. 7, fig. 7—13).

Herba glabra. Rhizoma? Pseudocaulis nunc 1.7 M. long. ± 10 mm. crassus in sicco conspicue costulatus.

Folia adulta breviter (10—20 mm.) graciliter petiolata, oblonga superne dilatata basi obtusa vel subacuta, apice obtusa vel subrotundata breviter abrupte anguste acute caudata, (acumen 15 mm.), crasse herbacea, in sicco utrinque viridi-olivacea costa straminea, glabra, margine imprimis ad apicem pilosa, 340 × 90, (P. = 4). F. juvenilia anguste oblanceolata caudato-acuminata basi attenuata acuta, inaequali, brevissime (4—2 mm.) petiolata, 230 × 30. Ligula parva (4 mm.) obtusissima, in sicco brunnea, glabra. Vagina costulata haud reticulata.

Inflorescentia parva cupularis, oblonga, toro brevi haud crasso setoso-hirsuto, scapo brevi tenui (20 mm.) squamis membranaceis, omnibus partibus glaberrima, toro et ovariis exceptis. Bracteae involucrantes paucae laxae, floribus triplo breviores ovatae acutae membranaceae laxe costulatae, 15 × 7 — 25 × 10 (in sicco!) Bracteae florales lanceolatae vel spathulato-oblongae, concavae flore appressae, 25 mm. (in vivo).

Flores inter minores (65 mm.). Bracteola 20 mm. longa tubulosa glabra, apice spathacea, biloba, bicarinata, lobis rotundatis 5 mm. longis. Calyx tubo longior (45 mm.) tubulosus apice spathaceus, lobus acutiusculus subcucullatus. Corollae tubus 35 mm. Petala labello breviora linearia apice rotundata, margine incurva, 20 × 5, dorsale 20 × 7. Labellum subcalceolare, subtrilobum, lobo mediano parvo rotundato (3 mm.), lateralibus magnis (25 mm.) auriculatim incurvis, stamen subincludentibus, 25 mm. longum, ad 10 mm. cum filamento connatum. Stamen petalo dorsali aequilongum filamenti pars libera 6 × 5, recurvum; anthera leviter incurva, (7 mm. longa), connectivo glabro apice truncato, haud emarginato; thecae, apice vix divaricatae sericeo-hirsutae, apice et basi setoso-penicillatae, pro 3/5 longitudinis dehiscentes. Ovarium hirsuto-sericeum. Stilus glaber, stigma obverso-trigonum, sutura horizontalis. Stylodia in nectarium quadrilobum cylindricum antice fissum concreta, 3 mm.

Fructus?

Distribution.

Java. Denu, 450 M., „in sylva virginea in collibus aridis. Flores toti clare punicei, labello flavo, herba inodora". BACKER 8887, 20/8 1913. Semel occursa.

This new speceis is apparently very rare, as are the primaeval forests, its habitat, in the lower mountain districts beneath 500 M. in West-Java, and it seems to be endemic, at least it has not been described, either by RIDLEY or by SCHUMANN.

It may be reduced almost with the same right to both *Achasma* and *Geanthus*. To the first it belongs because of the showy vacous involucralbracts, and the shape of the anther, to the latter because of the want of a limbiform prolongation at the top of the labellum (called appendicula by SCHUMANN).

It cannot easily be reduced to *Geanthus (Elettaria) minuta* BLUME, because of the narrow half bifid labellum, with subulate lobes, ascribed to that species by the author.

It seems to show some affinity to *Hornstedtia sanguinea* RIDL. specim. in Herb. H. bog.

Plate. 7.

Fig. 7. Flower with the bract; the bracteole which is shorter than the bract has been omitted, n. s.— Fig. 8. Flower laid open, n. s.— Fig. 9. Calyx, artificially split, n. s.— Fig. 10. Bracteole, enl.— Fig. 11 and 12. Pistil, enl.— Fig. 13. Nectary, enl.—

GEOSTACHYS RIDL.

RIDLEY in Journ. As. Soc. Straits branch Vol. 32 (1899) 157; Materials (1907) 44. K. SCHUM., Pflanzenr. (1904) 277.— *Alpinia* BAK. in HOOK. F. F. B. I. (1892) 257.

Geostachys sumatrana VAL. sp. nova?— Comp. *G. penangensis* RIDL. 1899-159.

Rhizoma ramosum radicibus aereis elevatum. Caulis ± 1.5 M. altus squamae basales stramineae, glabrae vix striulatae.

Folia breviter petiolata lanceolato-linearia longe attenuato-acuminata basi attenuata acuta 300—340—470 × 40 mm longa, glaberrima in sicco griseo-olivacea, costa valde prominente straminea. Petiolus gracilis 12—25 mm. longus. Ligula lanceolata acuta membranacea in sicco fulva ± 10 mm. longa, 3 mm. lata (in sicco). Vaginae glabrae striulatae.

Paniculae terrestres, erectae apice leviter decurvae ± 150 mm, longae, 60 latae pedunculo articulato tereti glabro ± 4 mm. crasso. Bracteae pedunculares magnae imbricantes bifariae accrescentes, stramineae cymbiformes acutiusculae, numero nunc 8; infima 15, summa 50 mm. longa, paniculae basin subinvolvens. Bracteae primariae minutae semicirculares. Cicinni pedunculati circ. 3-flori Ped. ± 10 mm. longi apice incrassati. Bractea floralis externa flores binos eodem tempore apertos alterum subsessilem, alterum pedicellatum cum alabastris bracteatis paucis involvens, 20 mm. longa.

Ovarium oblongum glabrum. Calyx bracteiformis ± 18 mm. longus. Corollae tubus totus inclusus apice dilatatus (± 15 mm.), labellum magnum trilobum, (lobis lateralibus antheram involventibus?) structura tenerum ± 15 mm. longum. Filamentum brevissimum (2 mm.), anthera lineari-oblonga, recurva glabra 7 mm. longa dorso basifixa, thecae lineares crasse marginatae, utrinque obtusae, connectivo vix producto. Ovarium glabrum oblongum, 3-loculare septis tenuibus, ovulis paucis. Stigma minutum cupulare ciliolatum Nectaria semicylindrica, in tubum conniventia, crassa, 4 mm. longa.

Capsula globosa + 12 mm. diam. calyce coronata in sicco coriacea rubra. Semina nunc 12 angulata, cuneata, arillo parvo.

Distribution.

West Sumatra, Eastcoast (Deli) Sibajak in primeval forest 1500 – 1700 M., frequent. LÖRZING No. 5984, 28/8-'18. „Herb. Rhizome supraterraneous, much branched. Inflorescences radical, numerous. Bracts straw-coloured yellow, brownish and pale green. Branches of panicle bright red. Flowerbuds green, bright red near the top. Petals pale yellow, labellum citrine, lobes with bright red patches. Flowers suaveolent. Capsules bright red".

This species though rather well agreeing with BAKER's diagnose of *Geostachys decurvata*, type of the genus, cannot however be indentified with that species because of the shape of the lip and the much smaller dimensions of all parts. Indeed by the very broad ovate lip it obviously differs from all malaccan species described by RIDLEY except *G. penangensis*. Here however the leaves are very shortly petioled, the floral bracts are puberulous, the calyx is 23 mm. long (fide K. SCHUMANN), the lip puberulous, the connective not prolonged, the stylodes lanceolate. The two species, however, if not synonyms are very nearly related.

ELETTARIOPSIS SUMATRANA VAL. N. SP.

by

TH. VALETON.

(With plate 9, fig. 1—8).

Elettariopsis sumatrana VAL. n. sp.

Herba (habitu *Gastrochilus*) acaulis, 1—3-foliata. Rhizoma repens pennae anserinae crassitudine, squamis brevibus fragilibus fugacibus bene vestita. Folia adulta longe petiolata, obovato-lanceolata, longe tenuiter caudato-acuminata, basi sensim attenuata in petiolum canaliculatum decurrentia, glabra, margine setulis vel callibus minutis distantibus irregularibis denticulata, in sicco grisea, per totam superficiem subtus nigropunctata, nervulis suberectis et costula pallida subtus prominulis. Folia ad 650 mm. longa, supra medium 80—100 mm. lata (vulgo minora), acumine 40 mm. longo; petiolus canaliformis 50—140—180 mm. longus. Vaginae (pseudocaulon sistentes) ± 250 mm. longae vel minores, exteriores (nunc binae) limbo carentes 60 et 150 mm. longae, glabrae. Ligula minuta, profunde emarginata, lobis ovatis ± 3 mm. longis et latis vel minoribus. Herbae juvenilis folia brevipetiolata minora elliptica. Inflorescentia radicalis parva, breviter peduncularis, strobiformis, cum pedunculo ± 80 mm. longa, 25 mm. lata. Squamae pedunculi breves (5 mm) arcte imbricatae. Bracteae oblongae (majores 20×6), obtusae, vix mucronulatae, membranaceae, stramineae, (externae steriles?). Bracteolae apertae minutae, bracteis conformes. Flores aperti desunt. Alabastra fere efformata 20 mm. longa, calyce saccato plane clauso apice minute 3-denticulato glabro membranaceo. Corollae tubus adhuc 10 mm. longus, gracilis; petala 3 oblonga cucullata et incurvo-marginata subcoriacea, dorsale stamen involvens, lateralia imbricata. Labellum petalis longius late ovatum, auriculis latis radiatim striatis parte mediana concava apice incurva (nunc 12 mm. longa et lata). Stamen ± 5 mm. longum, filamento brevi, connectivo angusto in cristam magnam late oblongam apice subobtuso concavam erectam rigidam producto. Thecae crista duplo longiores, suturis magnis lateraliter dehiscentes. Staminodia nulla. Stigma cylindricum, ostiolo apiculo dense longe ciliato. Stylodia tenera, subulata 2 mm. longa; ovarium glabrum triloculare Capsula singularis in apice scapi brevissimi, cerasi magnitudine, globosa, magis minusve 4—5 angulata et subcarinata, glabra, laevis.

Distribution.

Sumatra: Palembang, Rawas. (HEYNE'S collect. No. 1631. „Flower white with a greenish tinge, herb 1 M. tall, 15 mm. thick. N. i. *Puar tenangaoe*").

The species seems to me to agree in most characters with *Elettariopsis serpentina* BAK. of Penang, but our specimen is rather incomplete and the spike is not secund. It is however very characteristic by the quasi denticulate edge, due to distant short callous bristles, and the black points densely spread over the lower surface. It resembles much *Amomum repoeense* (PIERRE! msc.) GAGNEPAIN (1908) 114, by the *Gastrochilus* resembling habit; the marginal bristles existing also in that specimen.

Plate 9.

Fig. 1. Flowerbud still enclosed in the clavate entire calyx crowned by the marcescent teeth, n. s.— Fig. 1B. Same, 2 × n. s. *a* calyx, *b* anterior petals, covering one another, embracing the labellum, *c* dorsal petal, *d* stamen.— Fig. 2, 3, 4. Stamen. 4 × n. s.— Fig. 5. Labellum half developed (damaged) (= fig. 1B), 2 × n. s.— Fig. 6. Stigma, 5 × n. s.— Fig. 7 and 8. Capsule, n. s.

HORNSTEDTIA RETZ.

by

TH. VALETON.

(With plate 9—13).

HORNSTEDTIA RETZ.

RETZ. Obs. VI (1791) 18.— *Stenochasma* GRIFF. Ic. t. 359; Not. 3 (1851) 431.— *Donacodes* et *Elettaria* p. p. BL (1827) 53 et 54.— *Donacodes* T. et B. (1866) 57.—*Amomum* p.p. BENTH. et HOOK. (1830); K. SCHUM. (1827) 350; VAL. in MERR. 1906.—*Amomum* KOENIG in RETZ. III, (1779), 68.—*Amomum* BAKER, in Fl. Br. Ind. VI (1894) 233 p.p.—*Hornstedtia* VALETON in Bulletin de l' Inst. Bot. Buitenzorg No. 20, (1904)45, 62; Nova Guinea VIII (1912); ENGL. Jahrb. (1913).

The genus as proposed by RETZ (l. c.) was based on two species of a rather similar habitus and flower structure, differing however by the construction of the anther: *H. scyphifera* and *H. leonurus*.

The generic characters used by him were principally the strobiliform spike, with a terminal aperture, the filiform coroll-tube, and what he calls the „tubulose labellum" (=auricles reflexed on the back of the anther). GRIFFITH (l. c.) who described the same species afterwards as *Stenochasma*, does not give any generic characters. BENTHAM and HOOKER refer *Hornstedtia* to *Euamomum*, a subgenus of *Amomum* WILLD.

BAKER l.c. considered it as a subgenus and RIDLEY reestablished the original genus but he ranges into it all those species of the *Amomum* group, which do not belong to the *Eu-amomum* type and are placed by BAKER into the subgroups *Achasma* and *Geanthus* (incl. *Niocolaia* HOR. *Phaeomeria* LINDL.) and accepts two subgenera: *Eu-hornstedtia* and *Phaeomeria*.

SCHUMANN l. c. 1904 accepts the same groups but he bestows on both of them the rank of a genus.

The writer has tried to demonstrate in his first paper on *Zingiberaceae* of Java, Bull. 1904 l. c, and afterwards in Nova Guinea (1908) and ENGL. Jahrb. (1913) that by the construction of the flower and inflorescence *Eu-hornstedtia* and *Nicolaia* represent two well definable groups but only if the species belonging to the *Achasma*-group be referred to *Nicolaia* and separated form *Hornstedtia*. In the following I have tried to demonstrate in which way I opine the *Hornstedtia* group ought to be defined.

Diagnose.

Calyx tubuloso-spathaceus, superne dilatatus, apice minute tridentatus vel bilobus et bimucronatus. Corollae tubus elongatus, superne paullum dilatatus,

lobi oblongi subaequilongi, colorati, lobus posticus cucullatus erectus vel decumbens, latior, anteriores patentes basi labello plus minus adnati. Staminodia lateralia ad dentes parvas reducta, basi labelli inserta vel saepius nulla. Labellum oblongum vel calceolare basi auriculatum (explanatum triangulare vel ovatum vel hastatum) rigidum vel rigidiusculum intus concavum, hirsutum, marginibus et auriculis erectis vel his convolutis, cum petalis insertum et ea haud valde longitudine superans. Stamen petala et labellum aequans vel brevior, vulgo labello appressum. Filamentum lineare rigidum coriaceum in connectivum continuum, apice supra antheram projectum, rotundatum, marginibus valde incrassatis, vel nullum; anthera aut connectivo latiori et longiori antice infra apicem adnatum, thecis parallelis linearibus dense villosis, suturis vulgo brevibus basi saepe in calcaria filamento adnata lis aequilonga desinentibus aut sessilis, elongata, connectivo angusto, thecis villosissimis apice divaricatis vel obtusis, connectivo apice supra thecas vulgo brevissimo crasso recurvo, interdum in lobos parvos petaloideos paullo producto. Pollen globosum laeve abundans, magis minusve conglutinans. Ovarium oblongum 3-loculare multi-ovulatum, stylus tenuis stigmate ultra thecas exserto, parvo globoso et saepe gibboso vel obtriangulari vel cyathiformi apertura conspicua antica vel subapicali vel terminali. Stylodia bacilliformia vel linearia, vel brevia, carnosa, numero 2—8, libera vel, vulgo, in tubum longissimum vel breve, cylindicum integrum vel saepius lateraliter fissum apice incisum coalita.

Syncarpium globosum involucro inclusum. Fructus globosus vel oblongus, lateraliter compressus, pericarpio tenui coriaceo, lignoso-fibroso, extus laevi. Semina multiangula nigra, arillo saccato tenui.

Herbae elatae habitu *Elettariae*, rhizomate crasso lignoso ramoso internodiis brevibus, prope superficiem terrae subterraneo vel supraterraneo, interdum ope radicibus aereis supra terram elevato.

Inflorescentia capitato-spicata cylindrico- vel elliptico-fusiformis, rarius urceolaris vel clavata prope caulem e rhizomate nascens, pedunculo squamoso nunc brevi vel brevissimo saepe incurvo, rarius elongato, stricto suffulta. Bracteae exteriores ovatae vel oblongae, rigidiusculae extus reticulatae vel tomentosae steriles, involucrum apice apertum sistentes. Bracteae interiores florem singulum cum bracteola laterali appressa foventes, florem aequantes laeves albidae vel extus coloratae. musilagineae. Bracteolae rarissime deficientes, apertae in *H. leonurus* spathaceo-tubulosae (teste RIDLEY), membranaceae, corollae tubo duplo vel pluries breviores.

Discussion of the generic characters.

1. Inflorescence. The inflorescence is a spike or a spikeshaped head, fusiform or cyathiform by its outline, in one case (*H. rubra*) clavate, consisting of a fleshy peduncle, ending in a short and fleshy axis, forming mostly a convex or almost flat torus, rarely an elongate axis (*H. tomentosa* and *H. rubra*), in fruiting spikes always more or less elongate.

There is always a thick and fleshy scape, mostly short, often incurved, about as long as the spike, in *H. paludosa, H. alliacea* and *H. tomentosa* shorter, this is quite covered by the dense bifariate oblong-ovate scales which are much taller than the internodes, semiamplexicaul and widely inbricating, they increase in length from bottom to top and pass gradually into the outer bracts of the spike which they resemble in structure. In a few species (*H. elongata* etc.), the scape is elongate, straight, and tall from 200 mm. unto $^1/_2$ a metre. The internodes here are not abbreviate and as long as or longer than the scale-bracts, which imbricate at their top, leaving the higher internodes of the peduncle partly denudate.

The superior bracts together form an involucrum, the flowering bracts are included within. The number of the involucrating bracts varies from two (*H. rubra*) unto twenty *(H. alliacea*).

2. Involucrum. This is either fusiform or cyathiform (urceolus-shaped). In the latter type, which occurs in *H. scyphifera* and *H. cyathifera*, the outer bracts are stiffly erect with outward bent tips, the interior bracts become shorter gradually towards the center, they are of a (softer) consistence and are appressed to the outer bracts; seen from above they represent a rosette, depressed in the center.

In the fusiform type which occurs in the other species the outer bracts converge at the top so as to form a narrow canal through which the limbs of the flowers are projecting. In some species, *H. mollis* and *H. minor*, the mouth is but small and only a few flowers can protrude at once, in other ones, *H. pininga, H. paludosa*, the mouth is broader and a fascicle of corolla-limbs are protruding, always however only one or two flowers are opening at the same time and flowering during one day.

In the rather abnormal species *H. rubra* (*Donacodes rubra* BL.) the inflorescence is clavate. It resembles in shape the scyphiform type but the rachis is elongate and the inner bracts therefore though shorter than the outer ones are projecting beyond them and form a hemispherical instead of a hollow obconical roset. The true involucral bracts here are only two but the outmost floral bracts are of a thicker structure than the rest and take part in the forming of the involucrum. The bracts here are densely tomentose but not silky.

3. Bracts. The outer, involucral, bracts are always, according to their protecting function, of a rather rigid structure. Their protecting capacity is acquired partly by a dense tomentum, partly by a much thickened and reticulate dermal structure.

In one species only (*H. mollis* BL.) the bracts are with exception of the one or two lowest ones — still belonging to the peduncle, which are hirsute,— wholly glabrous and smooth, in a dry state very thinly ribbed, dark red. In *H. paludosa* they are densely silky tomentose white in the largest lower part, above and along the edges they are smooth and red.

In *H. cyathifera* and *H. alliacea* they are silvery-sericeous, quite smooth, the hairs only visible by using a glass, the margins glabrous, red. In

H. minor, *Rumphii, elongata* and *lycostoma* the bracts also are white silky-tomentose over a large area but above the midst and near the edges the hairs present a rather different character being composed and visible with the nude eye. The tomentum is more and more interrupted and consists of separate tufts of stiff silky bushy hairs. In *H. elongata* they are deflexed and of a peculiar pectinate appearance, in the other species they are round.

In *H. lycostoma* the bracts are silvery white tomentose, (the tomentum composed of hairtufts), over the by far largest part, only the top and upper margin are red and glabrous. In *H. minor* and *H. elongata* only the basal part of the bracts is covered with a joined tomentum, for the most part the hair-tufts are separate and the bracts being strongly ribbed, the hair-tufts are placed in irregular longitudinal files, and the surface of the bracts gets a more or less reticulate appearance. In *H. Rumphii* the longitudinal ribs are very strong and the hair-tufts placed in undulate transversal lines, and the edges are densely villous.

In *H. scyphifera, H. Pininga* and *H. tomentosa* Bl. (*H. villosa* Val.) the outer involucral bracts are rather strongly longitudinally ribbed and in the same time transversally crossed by small corky septs.

In *H. scyphifera* the reticulation is very prominent and regular the cross septs being as distinct as the ribs; only in the middle part of the bracts the longitudinal ribs are obsolete and the transverse septs are joining in an irregular and interrupted way, and are covered with a white down.

In *H. Pininga* (type and red flowered variety) the bracts are thinly but distinctly longitudinally ribbed and transversely crossed by wide corky septs, almost square and as broad as the interstices between them and in the middle part of the bract, so far extending that the interstices are quite filled up, so here the bract is no longer reticulate but almost even, only with small dispersed pits, only the side and upperparts are distinctly reticulate.

There is however in this respect some difference between the more common yellow flowering variety and the red-flowering variety. In the former one the bracts are glabrous in the adult state, and the even and smooth area occupies a large part of the bract. in the red-flowering variety again this even part is very small and the bract is almost wholly reticulate, moreover there are bristly hairs placed in the interstices, making the whole surface somewhat rough aud scabrous. In all specimens the edges are densely ciliate.

In the orange flowered variety (which perhaps should be considered as an apart species) the longitudinal ribbing of the bracts is getting very obscure while the crossing bars are very thick and irregularly confluent but not filling up the insterstices, forming a labyrinthoid net covering the whole bract, the margins of the meshes are finely puberulous while the interstices between them are conspersed with bristly hairs, making the surface very rough to the touch.

In *H. villosa* the bracts are strongly ribbed longitudinally over their whole surface and (at least near the margins) rather regularly transversely ribbed, forming square meshes. The transverse septs however are not complete, leaving open communication between the meshes and moreover they are mostly curved in different directions to the damage of the regularity of the trellis. In the young bracts the interstices are covered with rather long villous hairs and very rough. The edges are long ciliated. There is often a vague resemblance to the just described variety of *H. Pininga*, but the higher bracts are most characteristic by their long pungent points.

The inner flowering bracts embracing each a single bud with its bracteole until the projecting of the limb, are of a softer consistence, hyaline and mucilaginous. The upper parts of the outer ones which are exposed to the air are still coloured and pubescent; the inner ones are almost hyaline and smooth, and getting narrower toward the centre. In *H. villosa* they are provided with a prickly mucro, like that of the outer bracts

4. Bracteoles. Bracteoles are wanting in the species with long peduncled inflorescences and in *H. villosa*, in all other species each flower is accompanied by a lateral open (never tubiform) bracteole. K. SCHUMANN (1904, 200) states their absence in *H. minor* and *H. paludosa*, but he must have been misled by the study of very bad or wrongly determined specimens. In *H. minor* they are very small, linear, and at the innermost flowers they are sometimes quite obsolete; in *H. lycostoma* they are also flat and linear and not very conspicuous; in the other species they are about half as long as the coroll tube, in the *scyphifera*-group the bracteole is as long as the calyx, complicate or cymbiform and appressed to one of the thin edges of the compressed calyx, carinate and provided with a bristle, just like the calyx.

5. Calyx. The calyx is tubiform dilated above the middle and in the upper part split at the dorsal side so as to become spathaceous. It offers two different types in the species of this genus. In one group, of which *H. scyphifera* is a representative, it is much shorter than the corolla-tube, compressed, often with a short incision at the backside as well as at the face, and so becoming bilobed near the top and subbidentate, the third tooth being obsolete, the two opposed edges of the compressed tube are carinate thickened and often terminating in a thorny prominance, usually ending in a patent bristle, placed 1 or 2 mm. beneath the top. In the adult buds it does not protrude above the top of the corolla.

Here belong *H. scyphifera, H. Pininga, H. paludosa, H. riticosa, H. villosa*, and *H. rubra.*

In the other group the calyx is as long as or $^1/_4$ shorter than the corolltube, widely spathaceous, much dilated above, but narrowed to the top. The three segments constitute a wide lanceolate lobe ending in 3 very small usually penicillate teeth. In the adult buds it envelopes the coroll and projects above it in a lanceolate point.

Here belong *H. leonurus, H. elongata, H. Rumphii, H. mollis, H. minor, H. lycostoma, H. alliacea, H. deliana, H. cyathifera.*

6. Corolla and staminal-apparatus. There is always an elongate slender common tube widened a little above but never so much as to form a distinct faux, and a short two lipped limb, which alone projects above the bracts, and has more or less the shape of a snake's head or a duck's beak. The upper end of the tube is often dorsally compressed and its mouth (called „faux" by KÖNIG l.c. 69, 70) is a rather narrow transverse split. After the anthesis, which lasts 24 hours, the limb which at first is erect or almost horizontal is elevated by the rapid lengthening of the tube and soon is found hanging alongside the spike, without at first being much changed in shape. The limb consists of the dorsal petal (=segment=lobe), which is oblong or oblong-ovate with a rounded somewhat cucullate top and more or less incurved margins and by itself forms the upper lip, and the lateral petals, shorter and narrower than the dorsal one which are in most species connate at their base and adnate to the base of the labellum, in the same way as is seen in the genus *Zingiber.*

In most species the petals are patent and appressed to the underside of the labellum, a little projecting sideways near the top of this and forming together with it the lower lip. In H. *elongata* they are ascending and their free parts are placed sideways between the upper and lower lip of the coroll.

The labellum, which with the lateral petals forms the lower lip of the coroll is in the majority of the species about as long as the upperlip or a little longer, and placed just opposite it. It is what may be called „slipper-shaped" (GRIFFITH p. 433) and consists of a middle part,---broadly linear with a rounded apex and upcurved edges, rather stiff, and flat, hairy at the inner surface,---and two semilunate sidelobes or auricles of a more subtle petaloid structure at the lower part. Being explained, the lip has a more or less hastate or ovate shape. In the young flowers the stamen is applicated to and embedded in the concavity of the lip and its sidelobes are inflexed or convolute and cover the backside of the stamen, in the open flower they are suberect. In a few species *H. elongata, H. mollis, H. alliacea,* the lip is a little longer than the petals and the projecting tip is more or less ascending in their upper half, only the base being appressed to the labellum. In many species the sidelobes of the labellum are short not broad enough to cover the back of the stamen, only protecting it sideways. Here belong *H. leonurus, H. lycostoma* and many other species. In *H. villosa* the structure of the lip and stamen is different from all other species. There are no sidelobes to the labellum, and the middle lobe has a very thick fleshy rib bifurcate at the base. The stamen is appressed to the lip as in the other species but instead of being embedded in the cavity of the lip, the filament is broader than the lip and covers it.

In *H. cyathifera* and *H. rubra* the middle part of the lip is very short, not or only a little projecting beyond the large sidelobes. Explained it is trigonous-ovate broadly acuminate and as wide as tall and not very stiff, the stamen not being appressed to the labellum.

These constructions indicate a certain alliance between these two species and the genus *Geanthus*, which by its inflorescence approaches to *Amomum*.

Stamen. The stamen is always rather broad linear, with adnate anthers, with a short lorate or without a filament, it is always, at least just before the anthesis applied to the labellum and covered by the dorsal petalum. The anther shows two very different types both represented by the original types of the genus, *Hornstedtia* RETZ. *H. scyphifera, H. Pininga, H. paludosa, H. villosa, H. rubra*, the other is *H. Leonurus, H. minor, H. lycostoma, H. mollis, H. elongata, H. Rumphii, H. alliacea, H. cyathifera*

In the first group the filament passing without a demarcation into the connective to which the thecae are adnate is rather stiff leathery, linear oblong, projecting beyond the anther with a flat oblong rounded crest, also broader than itself and with thick fleshy margins. The thecae are linear, very hairy and produced at the base each into a sterile spur as long as itself, adnate, confluent with the thickened margins of the filament. The picture of GRIFFITH's (Pl. 358 f. 7) is not very exact, the short suture of the thecae and the sterile appendices having been neglected although they are clearly visible to the nude eye.

In *H. villosa* these spurs are wanting, here the filament with the connective is very broad ovate petaloid with much thickened fleshy margins.

In *H. rubra*, which in many ways is somewhat diverging from the other species the spurs are wanting also and here the crest is rather short and truncate, the filament is so short that the anther may be called subsessile.

In the other group the anther is sessile or subsessile, (with exception of *H. cyathifera* where the filament is long and broad), the connective does not project beyond the anther either laterally or at the end, so there is no ovate rounded crest, only the back wall of each theca is in some species a little produced, and forms a small rounded mostly recurved lobe. Sometimes (*H. lycostoma, H. leonurus, H. deliana*) the lobes are visible to the nude eye and the anther is said to be instructed with a bilobed or emarginate crest, in others (*H. minor, H. alliacea*) the appendix is invisible, and the anther is called emarginate and nude. The limit between the nude and crested anther is here very vague. The rather long thecae split along their full length. Comparing the structure of the anther in this group with that of *Alpinia* (*Catimbium*), *Elettaria*, *Geanthus*, the resemblance between these groups is extremely great, and the likeness surpasses by far that between the species of the two groups of *Hornstedtia*. BLUME taking the structure of the anther as a criterion, applied his generic name *Donacodes* to the crested group only, and he put *H. minor* where the crest is wanting into *Elettaria* with radical spikes, notwithstanding the close resemblance of the inflorescence with that of *Donacodes Pininga*. In the long peduncled species the anther is very long, and in the adult flowers only the upper part is free and opposed to the lip, the lower fourth being adnate to the basal part of the lip, forming together a prolongation of the faux above the insertion of the petals.

Staminodes. Staminodes have not been mentioned by the first describers KOENIG and GRIFFITH and are considered as absent in the more recent papers. Only GAGNEPAIN, the minute observer, regards as an equivalent of accrete staminodes two thickened broad lines ciliate at their base springing from the base of the labellum, and running parallel to the outer margins, thus determining the shape of the labellum, which he observed in the flowers of *Amomum Valetonii G.* (*Hornstedtia lycostoma* K. SCH!). This ingenuous suggestion is principally bore out by the discovery by the writer of free staminodes, originating exactly at the same point, in *H. scyphifera* and allied species. He however holds the opinion that not the thickened lines but only the ciliate point at their base is to be considered as the homologue of the last remnant of an obsolete staminode.

The staminodes of *H. scyphifera* are inserted between the filament and the lip a little above the base of the latter next to the base of the auricles, they are oblong flat, 1.5—3 mm. long and wide, puberulous at the bottom, they pass into the hairy line which seperates the base of the filament from the lip. (Tab. 10, fig. 1).

In *H. Pininga* and *H. paludosa* they are still shorter and curved awlshaped. In *H. Pininga* forma *sumatrana* they are obsolete.

In the other subgroup free staminodes are wanting—only in *H. elongata* there is a linear dentiform processus about 4 mm. long on the upcurved margin of the auricle. In *H. mollis* and a recently collected variety of *H. elongata* from Padang the dentiform processus is wanting and the margins of the auricle are profoundly crenate.

7. Pistillum. The ovary is oblong, compressed triangular, 3-celled, in most species sericeous, sometimes (*H. scyphifera*, *H. Pininga*) glabrous but with a ring of long hairs at the top. The slender style, mostly pubescent at the upperend, passes between the thecae and surpasses them in the open flower. In the *Leonurus* group the stigma is capitated and either broadly obtrigonous (*H. elongata* and *H. mollis*) or subglobose and rather small, in the first case it has a broad transversely elliptic mouth subapical but inclined to the ventralside, in the latter one the aperture is round or, in *H. alliacea,* semilunar, due to a depression of the upper wall and occupies the most part of the ventralside. Its margin is smooth and without ciles, with two vertical ciliate lips.

In the *Scyphifera*-group the stigma is cyathiform with an elliptic terminal mouth, here it is always densely hairy and the mouth long-ciliate. In *H. villosa* the style is only very little dilated at the top, very hairy and with a terminal round subtwolipped aperture.

8. Nectaries. Nectaries or stylodes occur in very different shapes in the diverse species. Commonly they are closely connected forming a fleshy tube embracing the base of the style, which under a slight pressure often splits vertically into two or more longitudinal lobes of ar unequal length. The

shortest nectary is found in *H. minor* and *H. lycostoma* where it is about as tall as it is broad (a few mm.), and divided by longitudinal incisions into oblong-conical lobes of different length, connected at the base. In *H. lycostoma* there are about 5, in *H. minor* about 8 of these lobes. In *H. alliacea* there are two broadly linear attenuate stylodes connected at the base at one side and surrounding the style-base, quite free at the other side, both stylodes or only one are bifid at the top and together they form a 4- or 3-dentate cylindric, at one side open tube.

In *H. mollis* there are 3 flat linear obtuse stylodes about 7 mm. long connected at the base forming an open cylinder.

In *H. elongata* the stylodes are a little longer, and mostly only one at either side. In *H cyathifera* there are two short fleshy bodies forming a short semilunar tube and a third very small lobe. In *H. Rumphii* they resemble *H. minor*, and not those of *H. elongata*, which for the rest is much more like it.

In the *Scyphifera-group* the stylodes are connected into a cylindric tube, sometimes very long (in var specimens of *H. scyphifera* 16 mm. long, in *H. Pininga* 12 mm., in *H. paludosa* 7 mm. long). In *H. scyphifera* there are two opposite incisions at the top, indicating the origin from two separate stylodes, in *H' Pininga* the tube is absolutely entire with a truncate top. In *H. villosa* the stylodes are lanceolate, connate at the base at one side, quite separate at the other one, about 7 mm. long, In *H. rubra* there are two free subutate-oblong 3 mm. long stylodes.

9. Fruit. The fruit as already suggested by SCHUMANN is rather uniform in the species of *Hornstedtia* (though only a few of them were known to SCHUMANN) and procured him an argument for the separation of this group from the other groups of *Amomum*. (ENGL. Jahrb. 27 (1899) l.c. 402).

It is always smooth (without protuberances of any kind), either covered with long appressed silky hairs, or glabrous (*H. Pininga*, *H. villosa* etc.) with a rather thin but very tough coriaceous, in old fruits woody-fibrous, pericarp, inwardly lined by a soft white membrane, which partly adheres to the septs when the outer skin is loosened. The fruits are not dehiscent but burst in an irregular way at their base. The seeds are smooth black polyangular and enveloped by a thinly membranous saccate arillus often pulpous in the ripe fruits.

The shape of the fruit is oblong, obovate, lenticular etc. laterally compressed in various ways by their accumulation and growth within the rather firm persistent involucrum; the agreeably acid and often aromatic pulp of the seeds is eaten by natives, squirrels and musangs (*Paradoxurus*).

10. Pollination. All species of *Hornstedtia* are commonly fruiting abundantly, and in open flowers the mouth of the stigma is mostly found filled up by a lump of pollen, which is often germinating and interwoven by pollentubes. How it has been conveyed there can only be stated hypothetically, for insect visits never have been observed. In all flowers there is an abundant stock of nectar contained in the tube and in some species

the flower seems quite adaptated for pollination by bees or moths. These are in the first place the long peduncled species, *H. elongata*, *H. mollis*, where the flower is „ringent". Here the anther is more or less ascendent during the anthesis, leaving some room between itself and the lip, allowing entrance to the head of a visiting insect of moderate size; the large obtrigonous stigma with its large transversally elliptic mouth, is projecting some mm. above the anther. The projecting coloured lip represents an exquisite point of support for the visitor and the wide, converging petals are as well a means of show as a protection. There is an abundance of pollen deposited on the surface of thecae and lip and by repeatedly introducing and retiring a pencil-point into a recently opened flower one is almost certain to deposit some pollen upon the edges of the stigma-mouth.

There must however be observed that the stigma is not provided with either lips or cilia 's and that there apparently is in the whole adaptation no predilection for autopollination or crossing.

Quite as perfect an adaptation for insect-pollination is found in *H. alliacea*, with its beautifully coloured far extending lip. Here however the spikes, freely exposed to the air on their long stalks in the two former species, are thronged around the rhizome, their lower part often being buried in the earth.

Here also germinating pollentubes are commonly found on the stigma.

In the species of the *Scyphifera* group at the beginning of the anthesis the anther is appressed to the lip, with the thecae down, and the rigid stamen, more or less conform in its shape to the concave lip, forms a quite fitting cover over it. At full anthesis the top of the cover is lifted a little and it is quite possible for any strong insect to force its head or body between stamen and lip. Of flying insects only large moths could come into consideration, with a proboscis 70 mm. tall which alone could reach the nectar. In *H. Pininga* and *H. paludosa* I did not find pollen lumps on the mouth of the stigma, while its hairy surface was densely covered by pollen; while passing the anther the clothing hairs collected the pollen, but the mouth of the stigma was shut off by the long cilia 's.

Only in *H. villosa*, where the cilia 's are much shorter, I always found the pollen lumbs on the stigma, and this species seems to be excellently adapted for auto-fecundation.

Conspectus specierum.

I. Subgenus **Scyphifera** *(Donacodes* BL.) Rhizomata subterranea vel radicibus longis supraterraneis elevata. Inflorescentia breviter scaposa. Bracteae involucrantes reticulatae vel sericeae. Bracteae florales involucro inclusae. Bracteola ± carinata compressa dorso filiformi-mucronata, in *H. tomentosa* deficiens. Calyx tubo corollae brevior compressus bicarinatus bilobus utrinque mucronatus. Petala rigida dorsale antheram fovens, anteriora vulgo basi connata labellum suffulcientia. Labellum linguiforme subrigidum, auriculis magnis supra dorsum antherae inflexis et appressis. Antherae thecae connectivo rigido apice producto et rotundato adnatae

basi steriles longe productae. Staminodia minuta calcariformia ad separatiorem labelli et staminis interdum adsunt.

H. scyphifera K. SCH. Banca, Sumatra. (Malacca).

H. Pininga (BL.) VAL. Java, Sumatra.

H. reticosa VAL. n. sp. Sumatra.

H. paludosa (BL.) VAL. Java.

H. villosa (T. et B.) VAL. Java, Borneo, Sumatra.

Huic sectioni referenda, mihi non visa: *H. reticulata* (=*H. Havilandii*) K. SCHUMANN l. c. 193, Borneo, BECCARI No. 32 et 1148, HAVILAND sine no., *pining* inc.

II. Subgenus **Elettariostemon** (=*Elettaria* BL.) Rhizomata vulgo subterranea. Inflorescentiae subsessiles vel scapis longis erectis. Indumentum bractearum e pilis compositis floccosis tomentosum, raro nullum vel subnullum. Bracteae florales totae involucro inclusae. Bracteola membranacea; bracteis infimis conformis, in *H. elongata* deficiens. Calyx spathaceo-fissus cor. tubum aequans in alasbastro adulto acuminatus clausus petala superans. Petala haud rigida nonnunquam circa antheram conniventes. Labellum calceolare auriculis erectis haud inflexis. Antherae connectivum haud in laminam brevem planam productum; thecae basi nudae. Staminodia calcariformia ad basin labelli nulla.

H. elongata (T. et B) K. SCH. Sumatra.

H. mollis (BL.) VAL. Java.

H. Rumphii (SMITH) VAL. Molucca's, Borneo.

H. minor (BL.) VAL. (affinis *H. ophiuchus* RIDL.) Java, cult., Borneo.

H. lycostoma K. SCH. New-Guinea, Melanesia.

H. alliacea (T. et B.) VAL. (comp. *H. conica* RIDL.) Java, Sumatra, (Malacca, Philippines?)

H. deliana VAL. n. sp. Sumatra.

H. cyathifera VAL. New-Guinea.

Huic sectioni referenda, mihi non visa *H. affinis* RIDL. (1899) 143, Borneo, HAVILAND 1764.

III. Subgenus **Rosianthus.** Rhizomata radicibus aereis elevata. Bracteae florales apice projectae, recurvae et cymbiformi-incurvae coronam rosiformem dilatatam sistentes. Labellum abbreviatum. Connectivum antherae rigidum breviter productum truncatum. Thecae basi nudae.

H. rubra (BL.) VAL. (species monotypica), Java, Sumatra. (Borneo?).

IV. Species male cognitae.

H. sarawacensis K. SCH. l. c. 191. Borneo, BECCARI 1435; *H. phaeochoana* K. SCH. Borneo BECCARI No. 615.

Key to the determination.

I. Inflorescences fusiform or more or less cylindrical or cyathiform. Floral bracts and flower tube wholly included within rigid involucral bracts.
  A. Connective rigid linear prolongate into a short rotundate flat crest, lip stiff (loriform) auricles reflexed on the back of the anther, thecae spurred at the base.

a. Involucral bracts very hard and conspicuously reticulate.
  a¹ Infl. cyathiform (dilated at the top), entirely red as are the flowers subulate staminodes . . . . *H. scyphifera.*
  b¹ Infl. fusiform not or very little dilated at the top.
    a² Rhizome elevate on large supraterraneous roots. Bracts without pungent spines. Flowers yellow or orange or dark red: *H. Pininga.*
    b² Rhizome creeping along the ground, or a little elevated. Bracts very rough and hairy when fresh. Bracts terminated by erect, pungent spines. No bracteoles. No staminodes. Stamen petaloid. Lip without auricles . . . . *H. tomentosa* (*villosa*).
b. Involucral bracts not or not conspicuously reticulate, whitish silky with a glabrous red tip. Flowers dark red, slender.
  a¹ Spikes large ovate many-flowered at the top. Tomentum of the bract joined without pores, upper $^1/_4$ part of the bracts glabrous red. Flowers slender. Calyx not surpassing $^1/_2$ of coroll-tube. Horn-shaped staminodes at base of stamen . . . . , *H. paludosa.*
  b¹ Spikes fusiform. Bracts almost wholly covered with a joined very thin whitish tomentum more or less densely conspersed with small transverse exsculpted pores. Edges glabrous, red. Flowers very large (120 mm.). Limb about (?) long. Calyx about $^3/_5$ of coroll-tube.

B. Connective not or very little longer than the anther with a fleshy more or less recurved bilobed margin no flat entire crest on the anther. Thecae not prolonged at the base, no staminodes at the base of the lip. Lip calciform, auricles erect or a little convolute, not reflexed. Indument floccose.

a. Spikes on long straight loosely bracteate erect peduncles 100—500 mm. tall.
  a¹ Bracts quite smooth, glabrous, brownish red, marcescent at the top, flowers dark red. . , ... , *H. mollis.*
  b¹ Bracts longitudinally ribbed, and reticulate by means of interposed hairtufts, whitish tinged red near the margin.
    a² Scapes surpassing 300 mm. Flowers white petals converging around the anther, pale red, lip rather longer than petals, pale yellow; anther half way adnate to the lip, very long, auricles of the lip crenate or with a dentiform process. Ligula and petiole glabrous . . . . *H. elongata.*
    b² Scapes varying from 100—400 mm. Flowers pale red, anterior petals placed below the lip, not converging with the dorsal lip. Lip calciform with short auricles, rather fleshy, not much longer than petals, Ligula and petiole villous . . . . *H. Rumphii,*
b. Peduncles shorter than spikes or as long, often curved, subterraneous.
  a¹ Spikes fusiform. Bracts red and whitish, tufted. Labellum calciform or linguiform.
    a² Indument tomentose smooth and joined in the centre, loosely tufted near the top and margins. Flowers dark red.

a³ Involucral bracts appressed, rounded at the top with a very small appressed mucro. Labellum not produced beyond the petals . . . . *H. minor*.

b³ Involucral bracts with rather prominent, recurved mucro. Labellum not quite covered by the very broad and short dorsal petal: . . . . *H. lycostoma*.

b² Indument smooth, silky whitish in the centre, top and borders red glabrous. Flowers pink, labelum linguiform produced beyond the petals. Leaves brownish in drying.

a³ Leaves linear (P 6 to 10), petiole slender (25---30 mm. long), all parts glabrous or subglabrous. Bracts broad acute appressed finely mucronate. Flowers slender, (in sicco 80 mm. long), exserted parts red-violet (rosea); labellum of the same color, claw narrowed, auricles small *H. alliacea*.

b³ Leaves linear oblong (P not surpassing 5); petiole short and thick gutterform (6---10 mm. long). Ligula as long as petiole. All parts softly pubescent Bracts with a strong patent mucro. Flowers (in sicco 100 mm). Petals red-violet. Labellum with a broad claw white with red semilunar patch . . . . *H. deliana*.

b¹ Spikes cyathiform, involucral bracts very long diverging at the top, not reticulate, silky tomentose, red, silvery white near the base. Labellum short with large erect and involute auricles, red with a broad yellow border . . . . *H. cyathifera*.

II. Inflorescence clavate. Flowerbracts projecting beyond the involucral bracts recurved and forming a rosette. Flowers small. Labellum short.

Hornstedtia scyphifera STEUD.; K. SCH. 1904, 195.--- *Amomum scyphiferum* KOEN., RETZ Obs. (1788) 68.— *Hornstedtia Scyphus* RETZ (1786) 18; RIDL. (1899) 140; (1907) 35.— *Stenochasma urceolare* GRIFF. (1851) 431, t. 358.— *Donacodes aperta* TEYSM. Cat. 1866. (Tab. 10, fig. 1—3).

Distribution.

Sumatra: Afd. Agam, Brani, 950 M. common in forest. (BüNNEM. No. 3377. „Flow. red, involucral bracts darkgreen red at upperend, stem 3—4 M. The spike being cut smells of *Calamus*"). S. A. Rembutan, Afd. L. Kota, 850 M. (BüNNEM. No. 3222 „Bracts darkgreen, fl. red spike urnshaped"). Siak, MOSZKOWSKI in Herb. Bog. (spica in spiritu vini).

Banca: Bakem, Sungeiliat, Beluka 690 M. (BüNNEMEIJER No. 1726, „fl. red nom. vern. *Pias*").

Malacca: Singapore, etc. (RIDLEY!)

Borneo: Sarawak. (HAVILAND, teste RIDLEY, non vidi., BECCARI?).

This species has been fully described several times, recently by RIDLEY and K. SCHUMANN, and it is not necessary to add a new description.

There are however a few points which deserve to be mentioned not being mentioned by other writers.

The staminodes usually considered as to be wanting in this group (e. g. RIDL. 1899, 140) are very conspicuous in our specimens especially in adult buds, but also good visible in open flowsrs. They are inserted between the filament and the lip and a little above the base of the latter next to the base of the auricles. Their free top is obovate, flat, 0.15 mm. long and wide, at the bottom they pass into the hairy line which separates the filament from the lip (fig. 1.)

The ovary is glabrous, but there is a ring of erect hairs at the top, surrounding the calyx.

The stylodes are the longest I met with in any species of this group, being 16 mm. long; they are linear-subulate, connate at their base and enveloping the style. The stigma is cupshaped with an apical linear ostium, very hairy with deflexed hairs, the style is rubescent only near the top.

The calyx is short, about 3/5 or 3/4 of the tube length (30---35 mm) tubular, dilated and subspathaceous above, complanate with a thickened rib at each side, subtrilobed, lobes obtuse, each with a rather long thorny tooth below the top, thinly membranous edges ciliate, rest glabrous.

The bracteole is shorter than the calyx, linear-lanceolate acute, carinate with a thorny mucro below the top, complicate and embracing the calyx tube.

Hornstedtia Pininga (BL.) VAL. in Bull. (1904) 46; Icon. bog (1905), tab. 169.—*Donacodes pininga* BL. En. (1827).--- Compar. *H. grandis* RIDL. (1899) 141. (Tab. 10, fig. 4---5).

Distribution.

Java: Mt. Gede, forest of Tjibodas 1500 M. (VAL. in Herb. bog. „fl. yellow, nom. ind. *Pining randjang*"). Pangerango S.W. forest of the Tjimungkat 1000 M. Pasir Datar. (VAL. in Herb. bog.). Mt. Butik Buligir' southside, 1000 M., forest. (BACKER No. 6169 „fl. yellow"). Mt. Salak, 1000 M. (BACKER, No. 6169, etc. HEYNE coll. ind. etc. „fl. red, leaves glabrous".) Mt. Galunggung, 1000 M. (DRS. v. LEEUWEN No. 6080, „flowers orange coloured with a yellow labellum, midrib woolly"), Mt. Sembung, Rongga, in young forest, 1300 M. (LÖRZING 1357, „flowers orange coloured, labellum yellow, anthera white, midrib woolly").

Sumatra: Mt. Talamau, N. W. declivity (Ophir mountains), 1200---1300 M., forest, common, (BÜNNEMEIJER 639 „flowers yellow, bracts green, darkgreen and red near the edges. Nom. ind. *Poear lolo kuku baniang*").

This species is very much variable in the colouring of the flowers. The most common form in Java, Mt. Gede, etc., also found in Sumatra on mt. Ophir, has uniformly sulfureous flowers. On the two other localities Mt. Galungung and Mt. Sembung the flowers are outwardly red-orange-coloured, but with a yellow lip. Those specimens collected on the

Salak have uniformly dark red flowers. At the same time their pubescence is variable, the leaves being quite glabrous, and the ligula glabrous and ciliate at the top in the yellow and red flowered specimens, whilst in the orangeflowered ones, the ligula is ciliate and woolly at the backside and the costa is densely pubescent.

The bracts are also rather variable as to the thickness and roughness of the reticulation of the bracts; in one specimen of a spike the transverse septs are very much widened and confluent leaving the interstices only as small erosed pits in a homogenous surface. The surface here is almost smooth on touching. There are however transitions.

The curious aerial roots by which the supraterrestrial creeping rhizomes of this species climb along tree stumps, etc. high above the soil have been amply described formerly. (Bull. 1904, 46). Among the Malaccan species described by RIDLEY, there is only one, that is said to have a rhizome elevated above the ground, *H. grandis*, and the description does not quite disagree with the species under consideration.

So the irregular transverse ribs of the bracts are mentioned by RIDLEY and in both species the stylodes are very considerable, though they are only 12 mm. long in *H. Pininga* and 25 mm. long in *H. grandis* (which might be a typographical error), and some of the differences may be a consequence of the dried state in which RIDLEY 's specimens were examined. In any case if the two species be synonyms, *H. Pininga* has the priority.

Hornstedtia Pininga VAL. var. **rubriflora** VAL.

Rhizoma scandens, radicibus longissimis aëreis. Folia brevi-petiolata, lineari- vel oblongo-lanceolata 600---750 × 80---100 (p. = 7.5, basi oblique attenuato-acuta apice acuto apiculata juniora ad apicem ciliolata, ceterum glabra, in sicco pergamacea olivacea, dense striulata. Petiolus teres subgracilis 5---10 mm. longus. Ligula anguste ovata, apice rotundata, longe ciliata, cetera glaberrima 10 mm. longa (15 mm. cum adnato petiolo), Vagina conspicue striata versus apicem ciliata, in parte inferiore septis tenerrimis latis rectangule reticulata. Spica fusiformis pedunculo ipsi breviore (60 mm.) bracteato fulta cum illo 160 mm. longa. Bracteae obsolete costulatae septis transversis latissimis vel subquadratis variis modis confluentibus labyrinthoideo-reticulatae, septis glabris vel margine minute velutinis, interstitiis pilosulis, scabriusculae. Florum corollae splendide rubrae labello flavo, auriculis aurantiacis.

Distribution:
Java: mt. Salak, supra 1000 M., endemica?

Hornstedtia Pininga VAL. var. **aurantiaca** VAL.

Folia oblonga basi inaequali breviter petiolata, petiolo adulta 500 mm. longa, 140 mm. lata, costa crassa valde prominens, cum petiolo villosa. Ligula brevis ovata apice rotundata, longeciliata at dorso villosa, vaginae apice dorso puberula. Bracteae per totam superficiem conspicue pulcherrime labyrinthoideo-reticulatae, septis transversim confluentibus minute puberulis, vallis pilis rigidis longiusculis magis minusve dense conspersis, scaberrimae, inprimis prope margines longitudinaliter costulatae. Corollae tubus rubro-aurantiacus, labellum flavum.

Large herb resembling the type in habit and flowerstructure, but differing by the pubescence of the leaves the reticulation and pubescence of the bracts and the colour of the flower.

Distribution:
Java, Mt. Sembung (near Bandong) (Rongga) 1300 M., (LÖRZING No. 1252, 1257. „Shadowy jungle. Ovary glabrous, calyx 47 mm. long, corolltube 90 mm. red-orange, lobes 20 mm. long, the two inf. lobes halfway connate. Labellum yellow, as long the stamen (25 mm.), biauriculate at the base, embracing the stamen, top rounded. Rhizome supported by long aerial roots, herb 3 M. high"). Mt. Galunggung 1000 M. (DRS. V. LEEUWEN 5 Dec. 1918, „flowers orange").

Hornstedtia paludosa (BL.) K. SCH. Pflanzenr. (1904), 200; VALETON (1904) 59; Ic. Bogor. (1905) t. 168.— *Donacodes paludosa* BL. En. (1827) 54.— *Elettaria paludosa* MIQ. (1859) 604.— *Amomum paludosum* K. SCH. (1899) 305.

Distribution.
Java: Mt. Salak 1650 M. (BACKER 9287, 20/8, 13). Josoredja, Pekalongan, 1650 M. in sylva juvenili, (BACKER 16222, 17/8, 1914. „Fruit eaten by natives, porcupines and musangs"). Mt. Gede, near Sindanglaja, ravine of the Tjiserua, 1100 M. (VALETON in H. Bog.). Krawang (DE MONCHY in H. Bog.). Tjinjiruan 1600 M. (SMITH & RANT No. 670, in H. Bog.). Rantja walini, 1750 M. „forest, socially". (BACKER 12737). Sindoro, 1600 M., in forest. (LÖRZING 739). Nirmala 1500 M. (BACKER 10705, 17/22, 1913).

Hornstedtia paludosa is probably the most common species of Java above 1500 M. and the most variable as to the degree of hairyness.

In most localities the leaves and ligula are quite glabrous, in some localities however (Mt. Salak, Mt. Gede) they are fugaciously villous at the lower side with a pubescent costa ligula and vagina. In a third form, cited by BLUME the leaves are glabrous with ciliate edges.

The vagina is but faintly ribbed, with broad and shallow often inconspicuous transverse septs, on the touch it is quite soft, not scabrous. The bracts are covered with a white farinose tomentum (of simple hairs) which ceases abruptly a little above the middle, the broad nude tip is dark red. The spike is broadly ovate with a large mouth. The flowers are very like those of *H. scyphifera* and *H. Pininga*.

At the moment it seems to be endemic in Java. At least I could not recognise it neither among the Malaccan and Bornean species described by RIDLEY, nor among the Sumatran species recently collected by the collector of the Buitenzorg Herb.

Hornstedtia reticosa VAL. n. sp. (Tab. 10, fig. 6---10).

Rhizoma supraterraneum, haud alte elevatum. Caulis ± 3-metralis. Squamae basales caulem et apicem rhizomatis vaginantes transverse exsculpto-reticulatae, septis valde irregularibus angulatis et dentatis labyrinthoideo-confluentes, partibus exsculptis transverse elongatis. Folia oblonga, brevi-acuminata (500 × 100) basi in petiolum brevem (5—10 mm.) decurrentia, glabra, margine sericeo-ciliata, fuscescentia. Ligula parva (5---10 mm.), margine et apice longissime lanuginoso-villosa. Vaginae squamis basalibus similiter sed multo tenuius reticosae septa multo tenuiora et minus prominentia, exsculptiones profusiores striis longitudinalibus magis conspicuis, vactu scabriusculae. Spicae breviter (60 mm.) pedunculatae fusiformes, cum pedunculo 200 mm. longae. Torus planus. Bracteae pedunculares et involucrantes externae ovatae et ovato-oblongae, summae 90 mm. longae, apice late rotundato, subtruncato et subemarginato, mucrone minuto terminali piloso fere per totam superficiem marginibus 3 mm. latis rubris exceptis indumento brevissimo denso sublaevi vestitae, hic inde poris exsculptis minutis rotundis et transverse oblongis nunc sparsissime nunc densius, imprimis versus apicem conspersae. Bracteae florales elongato-oblongae 100 mm. × 20 longus, apice bidentatus, dentibus sub apicem acutum spinulosis. Corollae tubus (?) mm. Limbus bilabiatus ringens. Corollae lobus dorsalis late canaliculatus et basi leviter inflatus 28 mm. longus, lobi anteriores basi labello subadnatae, illo paulem 4 mm. breviores. Labellum subgeneris. Stamen subgeneris 30 mm. longum. Stylodia semicylindrica crassa 7 mm. longa. Staminodiorum rudimenta nulla.

The flowers resemble those of *H. scyphifera* and more especially those of *H. paludosa*, but the staminodial rudiments are wanting and the flowers are much larger, the limb 1.5 times as long.

The Padang specimens are a little different by the indument of the leaves and ligula, the midrib being villous and the small ligula not as densely villous and in one specimen being glabrous. Many more species of this genus vary in a same way.

Distribution.

Sumatra: Sibajak in forest, 1500 M. common. (LÖRZING No. 5985, „Rhizome partly supraterraneous. Stem about 3 M. Inflorescences radical. Outer bracts sordidly brightred, uppermost ones brightred. Flowers dark red, bilabiate, ringent. Leafsheaths strikingly reticose-maculate pale green and greyishgreen"). Padangsche Bovenl. Mt. Talamau (Ophir) 1500---2000 M. common (BÜNNEMEYER 13.8.17. No. 694, 953, 1093. N. ind. *Poearlolo koekoebaniang*, „flowers red, bracts red below").

Hornstedtia villosa VAL. in Ic. II t. 170 (1905); RIDLEY (1908), 229---246.---*Amomum platyandrum* GAGN. in Bull. Soc. bot. Fr. 51 (1904), 450.---*Donacodes tomentosus* BL. En. pl. (1827).--- *Donacodes villosus* T. et B. Cat. 1886; Kruidk. arch. III 1855. (Tab. 10, fig. 15---16).

Distribution.

Java: West-Java, in Mt. Tjisondong 300 M. (BACKER). Mt. Salak at 300---1000 M. (vern. name „*pining tottot*"). Gunung Paniis prope Djasinga 400 M., in secundary forest". (BACKER, No. 10937). Ravine of the Tjisoka, near Tjidadap, 650 M. (BACKER No. 22472).

Borneo: Sarawak, Matang, Bau (teste RIDLEY l. c).

Sumatra: Oostkust, Deli, Sibolangit, 425. M., nature-reservation. (LÖRZING No. 5872. „Herb, rhizomes hard, short subterraneous and supraterraneous often with $^1/_2$ M. long aerial roots, but never ascending high. Foliaceous stems 1---2 M. tall. Old leaves green above pale green below, midrib a little brownish. Inflorescences short-peduncled, peduncle curved, ±40 mm. long, 5 mm. thick near the base. Spike fusiform, ± 100 × 30---40 mm., broadest below the middle. Bracts bright brownish-scarlet, with a needle-shaped green point under the top. One flower open at a time with several buds above it and withering flowers and fruits below. Fruits compressed, 25 × 20 × 7,5 smooth shining redbrown crowned by the calyx. No bracteoles. Ovary glabrous crimson, calyx bright crimson at the base, white above. Coroll (also in bud) beautifully scarlet. Flower always closed, by pressing the base at both sides it opens like a snake's mouth. Upper lip (dorsal petal) and underlip (anterior petals) almost equal, enclosing labellum and stamen both overlapping laterally. Labellum and stamen bright yellow. Style scarlet-crimson").

Hornstedtia elongata K. SCH. (1904) 200, excl. descript.; VALETON in Bull. (1904) in Icones bog. (1905) t. 166.--- *Donacodes elongata* T. et B. Cat. 1816, 57 et 380 (nom. nud.) var. *albescens*.--- *Amomum macronodum* GAGN. in Bull. S. B. (1904) t. 51, 450.-- *Amomum elongatum* K. SCH. (1899) 303. (Tab. 9, fig. 9---14).

Var. **taluensis** VAL. Characteres genuinae, sed labelli auriculae crenatae, sine processu dentiformi, teste collectoris: „Petals violaceous, lip with violaceous streaks. Bracts floccose-tomentose".

Distribution:

Genuina. Sumatra: no locality (probably near Padang). (TEYSMANN in 1857. Cult. in Hort. Bog.).

Java: Cult. H. B. III, 5, 7, 10, and 22 (the latter formerly distributed under XI B 42). Not wild.

var. *taluensis*. Sumatra: Padangsche Bovenlanden, in mt. Talu, in open forest, common, 850 M. (BÜNNEMEIJER 35, 8 April '17).

This species, donated only with a nomen nudum till then, was described almost simultaneously by the writer and by GAGNEPAIN from materials cultivated in the Bot. garden and derived from the original stock, imported by TEYSMANN, specimens having been sent to mr. GAGNEPAIN by the Direction of the Bot. gard. without my knowing, and without any notes about the derivance of the stock. GAGNEPAIN's excellent description was published under a new name *Amomum macropodum*, in Bull. 1904, (450). He was urged to propose a new name having compared his species to the description of *Hornstedtia elongata* K. SCH., in Pflanzenreich and finding some important differences between them. This however was a consequence of the fact that K. SCHUMANN had drawn his description from a specimen not of this species but belonging to *Amomum maximum* BL, a very common Javan culture plant called *hangassan* (name cited by K. SCHUMANN). Probably he recieved this wrongly labelled specimen from Leyde; and took it for the right one, though an original specimen was sent him about the same time from Buitenzorg. How this be, *Amomum elongatum* K. SCH. (afterwards *H. elongata* K. SCH.) and *A. macropodum* are identical and so the first name has the priority. T. et B. distinguish a variety *albescens* (cult. H. B. XI 42) from which some (or all?) of the materials sent to GAGNEPAIN issued, and a var. *coccinea*, which has died out before 1904. The writer never saw it. I wonder why GAGNEPAIN professed the flowers to be red (l. c. 451).

As said, the original stock, the flowers of which have been described by GAGNEPAIN is still existing in Buitenzorg, so the writer was able to make a study on living flowers of the interesting teratological appearance in the ovaria of this species, discovered by GAGNEPAIN and to be defined as a „pistillum intra pistillum" in otherwise perfectly normal flowers. He describes it as follows: „an included villous style terminated by an entire stigmatical lamel, contourned and replied on itself several times, attaining, being expanded, about 20 mm."

I examined several spikes of the plant and in all of them I met with it in the large majority of the flowers, only a few flowers in each spike were found without it, I therefore am able to add a few particularities to the description quoted.

The ovary in the normal flowers is completely three-celled, the septs meeting in the centrum and there connected into a solid fleshy axis; from which a double series of placental-branches projects into the cells bearing each a large number of ovules. Transversal sections through the abnormal ovary on different heigth showed that in the upperhalf of the ovary the central axis is more or less detached from the inner edge of the cells and on a certain point forming a loop, forces itself between two septs and descends within a cell to the bottom of it; there it makes a second loop, ascends to the top of the cell where it is recurved again and terminates in a kind of stigma about halfway the cell.

The length of the organ is, expanded, about 30 mm., it is commonly folded up twice with two loops at one and one loop at the other end. It is commonly quite solid, no trace of a style-canal, inflated above and crowned by an obtrigonous flat membranous lamel, or sometimes by an open membranous ciliate cup. In vivo it is white, the stigmal lamell pink, the whole organ is hirsute.

I examined several fruiting spikes, in one of which eight young fruits were developped, the other flowers being obliterated, and found in four of them the abnormal pistillum which had grown a short time together with the fruit but slowly drying up at the top. The remaining four ones were normal and the axe was solid unto the top. In all of the eight ones the seeds were developped quite normally.

Afterwards I found the same appearance in spikes of other stocks, and here were several variations on the one described above, e. g. a very distinct style-canal in one of the specimens. I regret not to be in a position to make an exact study.

Hornstedtia mollis VAL. Bull. Inst. bot. XX (1903), 59; Icones pl. (1914) t. 378.— *Elettaria mollis* BL. Enum. Pl. J. (1827) 52.; K. SCHUMANN in Pflanzenreich (1904).—? *Donacodes elongata* var. *coccinea* T. et B. Cat. 1866, 57 et 380.--- (Tab. 10, fig. 11---14).

Distribution.

Java: M. Salak, (v. HASSELT, BACKER, VALETON etc.). Denu, Patudja, sylva. (BACKER No. 9010, Aug. 1913). G. Sunarari, 900---1000 m. (Buitenzorg), (BACKER No 6336, Jan. 1913). Tjidadap, (WINCKEL, „stem ferrugineous"). G. Galunggung, 1000 m. (v. LEEUWEN, No. 1058, Nov. 1918). Cult. H. Bog. XI B III 48, e monte Karang leg. BACKER.

Sumatra: Sibolangit, Naturereservation, 400 M., in thin forest near a rocky slope. (LÖRZING No. 5407 11/11 '17. „Stems and rhizome very hard, stems about 3 M. long, lank and overhanging").

Though on first sight very much resembling one another *H. elongata* and *H. mollis* are perfectly distinguished by the following characters.

H. mollis:

Peduncle: 6---7 mm. thick in the middle, covered with reddish-palegreen rounded, mucronate ciliate bractscales. Stem itself yellowish or darkbrown silky tomentose.

H. elongata:

10---11 mm. thick, with darkgreen very shortly mucronate scales. Stem palebrown tomentose.

H. mollis:

Outer bracts: elliptic-ovate, 7---8, glabrous and smooth, silky only at the base, darkred (cod. 2) often with marcescent tops.

H. elongata:

ovate-elliptic, greenish (the very outer ones) and brownish-red covered with a lax white feathery tomentum, leaving the red margins free, not marcescent; the interior ones partly red partly pale yellow with thin red stripes very smooth, hyaline and coriaceous and red with a pulverish tomentum only near the top. The shape is narrower and longer than at *H. mollis.*

H. mollis:

Inner (flowering) bracts: Resembling the inner involucral bracts but pale red and hyaline getting narrower and thinner toward the center, the innermost lanceolate-ovate and white.

H. elongata:

only the two outermost ones resembling the inner involucral bracts. The rest all hyaline white or with a tinge of red.

H. mollis:

Buds: Limb red, tube white above, pale pink near the base.

H. elongata:

Limb and tube white, tip red.

H. mollis:

Flower: 100 mm. long, limb 35 mm. dark red, tube pinkish 76 mm. long; anther and stigma white, side petals a little shorter than the lip which they embrace unto the middle, dorsal petal remote from the side petals.

H. elongata:

Flower: 108 mm. long, limb 40 mm. longer than calyx, tube about 70 mm. long widening into a faux, side petals connivent with the dorsal petal, lip much longer and prominent beyond petals. Whole flower white, except pale lilac petals and pale yellow lip.

Hornstedtia Rumphii VAL. nomen novum.-- *Amomum Rumphii* SMITH in REES Cyclop. vol 39 (1819); VAL. in MERRILL, an Interpretation (1917) 151.---*Elettaria musacea* HORAN. (1862), 31.---*Donacodes incarnata* T. et B., Cat. 1866, suppl. 380 (nom. nud).--- *Globba longa major* RUMPH. Amb., 6, t. 60, fig. a et b (1750).--- *Hornstedtia elongata* K. SCH. msc. in Herb. Bog. („Bearbeitet für das Pflanzenreich" 1903).

Distribution.

Amboina: (RUMPH, BINNENDIJK, C. H B., ROBINSON no. 144).

Molucca's: South-east islands; Key. (RUMPH).

Borneo: Bukit Limpai, (TEYSMANN no. 10944 in H. bog., nom. vern. *Assem putjuk*). Mt. Kenepai. (HALLIER 1894 b, in Herb. bog., 1893---94).

Ceram: (north) Tableland south of Wahaai, 150 M., frequent in forest, (RUTTEN no. 10. „nom. ind. *Galoba djantoen* fl. lightred, 4 M. high, fruits eaten"). South Ceram, in a garden near the sea at Woloe. (RUTTEN No. 703, fl. lightred, 5 M. high).

This species has been introduced into the Bot. Gard. of Buitenzorg from Amboina before 1866, and was mentioned as *Donacodes incarnata* T. et B. in the second edition of the Catalogue. The Amboina plants have died out in the garden, but an authenthic specimen still remains in the Herbarium, consisting of some adult leaves and some young flowering-scapes. Evidently the same species though with rather thicker scapes was collected in Borneo first by TEYSMANN (1875 ?) afterwards by HALLIER (1894), and lastly ROBINSON collected specimens in Amboina, identical with those of BINNENDYK.

Though there is an abundance of names to this species, the only description existing, being the base of them all, is that of RUMPHIUS, which, excellent in its kind, gives not many phytographical details. A few flowerbuds in the specimens of BINNENDIJK's and ROBINSON's and open flowers preserved in spirits recently sent from Ceram by Dr. RUTTEN allow me to complete the description.

Leaves very short petioled, oblong or linear-oblong (700 × 100), shortly acuminate with a long hairy apicula, with an acute base, quite glabrous but densely ciliate at the edges and top.

Sheaths striate rather feebly transversely ribbed. Ligula short (10---15 mm. densely tomentose, like the upper margins of the petiole.

Inflorescence fusiform, moderately peduncled. In one entire infl. of ROBINSON'S the scape measured only 240 mm., the head 100 mm. In the Ceram specimens the length of the scape varied between 100 and 250 mm. In the bornean plants however it surpassed 450 mm., the head attaining 120 mm., and also in the Ambon specimens collected by BINNENDIJK the only preserved upper part of the scape is much stronger and apparently taller than in the ROBINSON specimen. Scape silky-tomentose, quite covered by the bracts which pass successively into the involucral bracts. All bracts are oblong or oblong ovate with a broad, rounded or somewhat cordate appressed top, with a small, weak mucro. Middle part of the bracts ribbed and distinctly reticulate by transverse bars covered with white condensed tufty tomentum (somewhat like *H. scyphifera*, only less prominent) to the base the tomentum gets more dense, smooth; the margins of the bracts are densely covered with appressed hairs. Torus flat, involucral bracts very long, 90---100 mm. Bracteole wanting; in the Ceram specimens bracteoles occur conform to the flowerbracts, 45 × 5, glabrous.

Flower resembling most that of *H. minor*. Buds acuminate, enclosed by the calyx, 52 mm. long with a penicillate top, acumen 15 mm. Calyx spathaceous lanceolate acute, subentire 60 mm. long in an open flower villous with procumbent hairs, silky villous at the base, like the ovary. Coroll tube densely hairy. Petals broad, rounded subcucullate at the top, not converging around the anther, the lateral lobes sustaining the lip but not connate at the base. Lip oblong ovate (calceiform), with narrow erect auricles, incurved upon the anther, a little longer (3 mm.) than the petals, with an elevated villous line bordering the hairy central bar. Anther sessile, long, linear, divaricate at the top and at the base, with a small narrow bilobed crest, with round lobes, each lobe terminating a theca. Thecae tomentose, connective subglabrous. Staminodes O. Stylodes 2---3 mm. long, consisting of about 8 cylindric, irregular, blunt, concave corpuscules connected at the base and converging around the style, persistent and forming a knot upon the fruit. Style hairy near the top. Stigma obovate or pyriform with a round dorsal aperture.

Fruit oblong hairy.

The flower is pale rosy with a white anther (RUMPH); incarnate (peach coloured) (BINNENDIJK); light red (RUTTEN).

H. Rumphii is unlike *H. elongata* in the herbarium, though the flowers are rather different and more resemble those of *H. minor*. In the herbarium they are easily distinguished by the dense, setose tomentum of the edges of the invol. bracts in this species, both glabrous in *H. elongata*.

Hornstedtia minor (BL.) VAL. (1904) 57; (1905) 241, t. 167; K. SCHUM. (1904), 199.-- *Elettaria minor* BL. (1827) 53.-- *Amomum Valetonii* GAGNEPAIN (1908) 430, pro parte.--- *Amomum minus* K. SCH. (1900, 350)?--- *Donacodes minor* T. et B. Cat. 1866, 380.---? H. *ophiuchus* RIDL. 1893, 381; 1899, 141; 1907, 36.

Distribution:

Java: Mt. Salak and environs of Buitenzorg in the lower hill zone, not at sea-level, often cultivated; vernac. name *Pining kissie, Pining landak* and *Pining lanang.* The natives use these names for diverse varieties they distinguish. BLUME distiuguishes a variety with sericeous leaves, which is said to be called *Pining lumbut (lumbut* soft). I did not meet with it. The species as yet has not been found any where else on Java

Borneo: West-borneo (leg. TEYMANN and TEUSCHER, locality unknown, cult. in Hort. bog. XIB III 2, and XIB III 24, TEUSCHER). Not found in Sumatra, not in Banca.

Malacca? *H. ophiuchus* RIDL.?

The distribution is rather peculiar, a species of such a limited dispersion being known only from two so remote localities, without an intermediate station. But I suspect that this species is not uncommon in Malacca and has been described by RIDLEY as *H. ophiuchus* (RIDLEY l. c.).

About the synonymy of this species I have to make the following remarks:

Mr. GAGNEPAIN argues l. c. that the species I described under this name in Ic. bog. l. c. is not the same as *Hornstedtia minor* K. SCHUMANN l. c. and that the latter being published a month before mine has the priority, so my species must be rebaptized. He proposes to call it *Amomum Valetonii.* I am sorry to declare that I have many objection against this conclusion. Mr. GAGNEPAIN gives the following differences between *H. minus* VAL. and *H. minus* K. SCH. In the former the scape is long 80 mm: the connective is nude; the bracteoles are wanting. In the latter the scape is very short the connective ,,supra loculos brevissime productum, late emarginatum", the bracteoles ,,tenues pellucidae hic inde deficientes vel obsoletae.

Now the first point is due to some want of exactitude in my description. In the living spike the peduncle appears really very short (see Ic. citat. fig. 1.) and if SCHUMANN had seen a good specimen, he certainly would have called it very short scaped as well. Facto however the peduncle is almost as long as the spike, but it is masked in its upper part by the relatively large peduncular bracts which apply themselves to the spike bracts, and cause the fusiform subsessile shape of the spike. Only in splicing the spike the scape is quite visible. The two other points do not present any real difference, only the figures (10 and 11) are showing a crest exagerated by the fancy of the dessinator.

Indeed there is not a trace of doubt that K. SCHUMANN and I did describe the identical species.

Now Mr. GAGNEPAIN was misled by his identification of my *H. minor* with a plant from the Solomon isles, collected by RECHINGER and belonging to the Vienna-Herbarium. This plant however does not belong to *H. minor* but to *H. lycostoma* LAUT. et K. SCHUM; a species very common in N. Guinea and the eastern Archipelago (See below).

Hornstedtia lycostoma (LAUT. et K. SCHUM.) K. SCH. 1904, 194 (excl. descr); VALETON in N. Guinea VIII 1907, 927; Engl. Jahrb. 52 (1914), 53.)--- *Amomum Valetonii* GAGNEPAIN 1908, 55, 350.---*Amomum lycostomum*, LAUT. et K. SCH. 1899, 305; 1900, 228. (cum fig. 25, B. C. D.) (Tab. 11).

Distribution.

North- N. Guinea: Dore, TEYSMANN! 6769! in H. bog. (1876), Humboldtbai. (GJELLERUP! 100, 1910).

South-west New-G.: Noord river (VERSTEEG! 1094, 15/4 1907). Mt. Goliath. (DE KOCK!).

North-east N. G.: K. Wilhelmsland, (LAUTERBACH! 2542; type of species). Kelel, in sec. forest, 150 M. (SCHLECHTER.16332).

Ceram: near Wahaai. (RUTTEN sine numero, 10 bis).

Aru-isles. (MOSELEY, BECCARI, teste K. SCHUMANN).

Bismarck-arch.: Neu-Mecklenburg, (PEEKEL 159, nom ind. *a daldal*).

Solomons-arch. (RECHINGER, teste GAGNEPAIN).

Cult Hort. bog XIB 4 (Skroë, leg, TREUB). XIB 21 (Mt. Goliath, DE KOCK).

This species is very nearly allied to H. *minor* from Java and Borneo and in Herbarium it is not always easy to distinguish them. The foliate stems are much resembling one another and in both the sheaths are densely ribbed and reticulated by transverse veins. This reticulation however is quite inconspicuous in the living plant and appears only in drying up; it is a little more pronounced in *H. lycostoma*, and in some specimina the transverse veins are very prominent and scabrous. In both species the petioles are very short, 10 mm. or less, and the ligules are small ovate rounded, shorter than the petiole which is adnate to them at the base. In *H. minor* however they are glabrous, rarely thinly pubescent at the backside, in *H. lycostoma* they are densely tomentose.

In both species the spikes are subsessile, fusiform, the outer bracts are white silky tomentose in the lower part; above and near the margin the tomentum dissolves into separate short dense hairtufts forming a floccose tomentum. The top and margin are dark red. But the shape of the spikes is very different. Those of *H. minor* are very narrow and long at least 10 times longer than broad, while flowering, increasing but little in fruiting. Those of *H. lycostoma* are elliptic-fusiform only 4---5 times longer than wide in flowering. Moreover the bracts here are spinosely mucronate, with erect and a little extant hard tips, in *H. minor* they are quite blunt with an obsolete mucro, appressed, so the spike is quite smooth.

The flowers are very alike in both species and of the same splendid red colouring, the lip is calceolate with short erect auricles, but in *H. minor* the coroll-lobes longer than the lip and narrower. In *H. lycostoma* the flower is much wider and the dorsal petal is much shorter than the lip and as wide. The anthers are much resembling in both species. In both the top is emarginate the thecae long linear and densely villous splitting along the whole front, but in *H. lycostoma* the connective continues a little beyond each of the thecae, forming a short bilobed or deeply emarginate a little recurved appendix, while in *H. minor* there is only a thickened emarginate recurved edge.

The calyx is red in *H. lycostoma*, snowwhite, beautifully gauzy reticulate in *H. minor*. The flowerbracts are oblong acute, thin glabrous as long as the flower, white in *H. minor*, partly red in *H. lycostoma*. The bracteoles are very small and the innermost ones almost obsolete.

The stylodes are peculiar in both species, they are short (2 mm.) and connected to a hollow cylinder around the style, composed of numerous (5---8) oblong conoid corpuscules free at the top and of rather inequal size; but their number does not surpass 5 in *H. lycostoma* and arises to 8 in *H. minor*. SCHUMANN calls the „petals" white; in all our specimens however and also in the original spec. of LAUTERBACH 2542!, quoted by K. SCH., the petals and the whole flower were red only the anther was white, and an obtuse crest of the anther as mentioned by K. SCHUMANN does not exist either here or in any species of this group.

This species, which is very common and largely dispersed in the papuan archipel shows more or less important varieties. So the mountainous form collected by Mr. DE KOCK, has larger more squarrose spikes, larger and wider flowers shorter petals, etc. than the original form from lower places. There is also variation in the reticulation of the sheaths.

Horntedtia alliacea VAL. in Ic. bog, (1912) t. 350.--- *Donacodes alliacea* T. et B.! Cat. H. bog. 1866, sine descr.--? *H. conica* RIDL. (1899), 124.

Distribution.

Java: Batavia, Buitenzorg, sea level to 100 M. Cult. in pagia. (nom. ind. *Pining bawang*). Prinseneiland. (leg. NATHANSON in Herb. bog. spont. Cult. in Hort. Bog. (Nursery).

Sumatra: Lampong, Seputih-Tulong-Bawang,-Kuta-Bumi. (GUSDORFF, Febr. 1914, No.177 „Between other plants of the order socially in swampy jungle along rivulets"; vern. name: *Ketimbang ketanim*).

? Riouw: Pulu Bintang. (leg. TEYSMANN !). Determination uncertain.

? Malacca. (RIDLEY, *H. conica*).

? Philippines. (ELMER 10246 in Herb. bog. labelled *H. conica* RIDL.) The fragmentary specimen cannot be identified, but the silky covering of the bracts reminds *H. alliacea* and *H. deliana* VAL. The villosity ol the leaf is more like the latter.

To my full description (Ic. 350) I have to add still a few details. The bracts here are ovate, the inner sterile bracts which are very numerous are oblong acute. All are silvery sericeous over the whole surface, only red near the margin, all quite smooth, the silky hairs only perceivable by means of a glass, are tufted (floccose) like those of *H. minor*, but more condensed. Bracteoles are present, linear, acutely acuminate very thin, 50 mm. in the outer, 25 in the innermost flowers and appressed to the calyx. being easily overlooked. The floralbracts are oblong acuminate concave membranaceous, the shortest 80 mm. long.

The calyx is as long as the coroll tube and envelopes the adult bud, being prolongate above the coroll into a point, as in the other species of this group. The anther is different from all other species of the genus. There is no crest but the thickened upper margin of the connective is emarginate between the thecae which are as long as the connective, but the rim of the thecae is much shorter than their length and occupies only 2/3 from the base.

The stigma is also rather peculiar, it is very small, obovate and with a large crescent-shaped mouth, (in open flowers always filled up with a woolly substance consisting of the pollentubes) at the face; the back wall is very little prominent.

The lip is twice as long as the petals that form a roof over the anther which is half enveloped by the rather small trigonous auricles or sidelobes of the lip. The colour of the flower is bright pink. By the shape of the lip it approaches the *Achasma* type.

The stylodes are short and thin, they consist of two irregular hemicylindric acute lobes one or both bifid at the top, forming an oblique short one side open tube around the style.

Hornstedtia conica RIDL. agrees doubtlessly in many points with *H. alliacea*, and if the two species be identical the latter name, being a nomen nudum, must be rejected, although there is an authentic specimen in the Herb. bog. However, I did not see *H. conica* and the adumbration is too short to allow absolute certainty about the identity so provisorily I retain the very suggestive name of T. et B.

H. conica cannot be determined by means of the monography of SCHUMANN, owing to his very curious description of the leaf. Evidently SCHUMANN took the description of the sheath in RIDLEY's diagnose for that of the leaf, the word „sheath" having been omitted by a printer's error in the original text.

Hornstedtia deliana VAL. msc. n. spec.

Rhizoma subterraneum. Caulis 1.5—6 M. altus pubescens. Folia breviter petiolata, oblonga basi et apice sensim attenuata breviter anguste acuminata, basi acuta, (500 × 100—580 × 110); membranacea, supra glabra subtus mollia, siccando castanea, margine breviter villoso-ciliata. Petiolus 6—10 mm. longus canaliculatus. Ligula ovata, petiolum circ. longit. aequans et cum eo dorso villosa. Spicae late fusiformes, demum obovato-fusiformes breviter pedunculatae, prope cormum confertae, pedunculo subterraneo. Bracteae externae late ellipticae (60 × 35) apice patenti-muronatae parte inferiore sericeo-tomentosa, albida, versus margines glabrae rubrae. Torus brevis crassus.

Bracteolae adsunt. Flores graciles. Calyx tubulosus apice dilatatus et breviter spathaceus, lobus lanceolatus acutus subdenticulatus et ciliatus, 50—55 mm. long., pilosus basi sericeo-pilosus. Corollae tubus paullum longior (55—60), gracilis. Petalum dorsale late ellipticum cucullatum ± 25 mm. long, anteriora basi connata patentia. Labellum lobo mediano lato rotundato ante petala 6 mm. projecto, margine crispulo sensim in auricula lata brevia erecta et convoluta dilatato, explanatum late rotundato-ovatum versus basin attenuatum, 32 mm. longum, 16 mm. infra medium, 12 mm. ad apicem latum; album macula semilunari rubra notata. Anthera valde elongata (25 mm.) sessilis labello inde a basi opposita haud tamen auriculis adnata (sicut in *H. elongata)*; thecae totae fertiles, apice divergentes connectivo bipartito, lobis magnis rotundatis (3 mm.) supra thecas producto Stylus et stigma glaber. Stigma capitatum parvum subglobosum, dorso gibbosum, ante ostio magno obsemilunari occupatum. Stylodia semicylindrica tenuia in tubum 6 mm. longum conniventia.

Distribution.

Sumatra: Nature reservation Sibolangit, in humid forest 500 M. (LÖRZING No. 5513, 6. 2. 18. „Inflorescenses numerous crowded, periodically flowering, short peduncled halfcovered in in the soil, obovate-fusiform, 120 mm. long, 45 mm. broad. Outerbracts rigid, pale grey with a dark red margin, becoming larger with the innerbracts, therefore top of the spike entirely red. Bracts much appressed, with a rather stiff patent mucro. Innerbracts and enclosed parts of the outerbracts white with a brownish membranous marge, mucilaginous. Flower, 1—3 open at a time, partly produced above the narrowed top of the spike. Calyx spathaceous with an acuminate top. Petals pink *(lakrood*, sic.). Superior lobe larger, anterior lobes half way united. Labellum oblong-ovate with a wide claw, limb a little dilated, entire, finely crisped, white pale yellow bordered, with a red semilunar patch. Connective emarginate, subbilobed, whitish, thecae yellowish. Capsule smooth").

? Philippines. (ELMER no. 10246).

This species shows relations to *H. alliacea (H. conica* RIDLEY) which it resembles by the shape of the spike and the character of the bracts and also somewhat by the projecting crisp. The very long anther with bilobed crest and the whole shape of the flowerlimb refer also certainly to the long peduncled species of this group. *(H. elongata* etc.). By the leaves and indument of the bracts it resembles very much a specimen of ELMER. (No. 10246) determinated as *H. conica* in our Herbarium.

Hornstedtia cyathifera VAL. in Nova-Guinea (1913) 929; Zing. D. N. in ENGL. Jahrb. 52 (1914), 53. (Tab. 12).

Distribution.

South-West-N.-Guinea: Alkmaar. (VERSTEEG! n. 1523. RÖMER! 414), North-East-N.-Guinea: Kami-mts., 1000 M. (SCHLECHTER! 17768).

The inflorescences have quite the same beaker shape as those of *H scyphifera,* only smaller. The outerbracts are as stiff and erect just as these, with rather acute extant tips, but in stead of reticulate they are quite smooth silvery silky, in vivo silvery white at the base, for the rest red.

The flowering bracts are much shorter and weaker.

The bracteole is tubiform spathaceous at the top and bilobed, half as long as the corolla tube, enveloping the corolla only in very young buds. The calyx is a little longer than the bracteole and of the same shape enclosing the young corolla until it is halfgrown, and acuminate in the bud.

The petala are very broad, the dorsal one elliptic.

The labellum is threelobed but the middle part is short and not stiff, the sidelobes or auricles very large, rounded and enveloping the anther only in the bud. Being flattened it is as long as wide, 20 × 20 in an adult flower.

The connective is truncate not longer than the anther, but the top is a little recurved and thickened.

The filament is longer than the anther very broad at the base, narrowing to the top but broader than the anther, adnate to the lip only at the base below the auricles.

No staminodes. Stylodes, connected forming a cylindrical hollow body, bilobed at the top open at the backside.

Hornstedtia rubra (BL.) VAL.--*Donacodes rubra* BL. Enum (1827), 54.--- *Nicolaia rubra* VAL. in Bull. (1904), 31, 46 (nomen tantum)--*Amomum rubrum* K. SCH. Pflanzenreich 250 (1904); ENGL. Jahrb. 1899 (Tab. 13).

Rhizoma digitum crassum supra terram repens, et ope radicum aërearum longarum scandens (modo *H. Pininga*). Caules mediocres. Squamae vestientes dense imbricatae trigonae obsolete striatae et tomento denso, villoso obtectae.

Folia longiuscule petiolata (25---30 mm.), basi acuta apice attenuata breviter apiculata, lanceolata (450 × 110 vel minora), in spec. javens. jam novella glaberrima, in spec. sumatrano molliter puberula, in sicco pergamacea vel subherbacea, supra atro-grisea subtus brunneo-avellanea, dense venoso-striata, costa gracili.

Ligula late oblonga apice rotundata, membranacea, in sicco fragilis, glabra, (15--25 mm. longa × 10, cum parte quasi adnata). Vaginae tenere striatae, sub lente incospicue rectangule reticulatae, glabrae. Spica clavata (sive turbinata) cum scapo breviore vel longiore, nunc ipsa duplo longiore, 100---180 mm. longa. Bracteae exteriores scapi apice rotundatae spinuloso-mucronatae ellipticae tenere striatae, tomento brevissimo denso vestitae laxe imbricatae a basi inde increscentes, in spica ipsa (fertiles) distantes (3---5 mm.), strobilaceae, patentes, intus concavae apice acuto recurvo pursas aquiferas (*Curcumae* modo) sistentes. Br. exteriores (in spica parva) rotundato-ovatae, 40 mm. longae, 40 latae, apice late rotundatae, sub apicem brevi-mucronatae minute dense farinoso-tomentosae. Br. florales coronam rosaceam sistentes obovatae 45 × 40; internae angustiores,

membranaceae apice rigidiore, acutae recurvae dense conspicue striatae, glabrae. Torus elongatus spiciformis, bracteis subdistantibus. Flores parvi (± 65 mm.). Bracteolae parvae (15—20 mm.) ellipticae acutae cymbiformi-complicatae. Calyx tubulari-spathaceus, compressus, 3-dentatus, dentibus subspinulosis facile fissis (unde species), lateralibus cucullo brevi spinuloso dorso infra apicem instructis. Corollae tubus apice leviter dilatatus sine fauce 35 mm. longus. Petalum dorsale 15 × 5 oblongum apice rotundatum, cucullatum; petala lateralia demissius inserta patentia, labello appressa haud adnata, oblonga (15 mm. long.).

Labellum suborbiculari-ovatum lobis lateralibus cum parte mediano lineari nervosa unitis (generi *Curcuma* haud absimile), marginibus incurvis apice inflexis canaliculatum, lobis lateralibus antheram includentibus. Filamentum brevissime fauci adnatum, staminodia obsoleta. Anthera subsessilis oblonga connectivo crasso apice rotundato thecas breviter (2 mm.) apice nec non marginibus excedente, thecae lineares utrinque acutae basi haud appendiculatae, per totam longitudinem dehiscentes, in latere mediano hirsutae pilis deflexis. Staminodium rudimenta pubertate visibiles prope basin thecarum. Stylodia 3 mm. longa, subulato-oblonga. Stylus glaber, stigma parvum obconicum hirsutum.

Distribution.

Java: West-Java, Tjipatudja, Denu, in sylvis primaevis at 450 M. (BACKER 8850, 20 Aug. 1913, „Flowering bracts dark red, gutterpouches filled with water at times when all in the forest is dry. Calyx, corolla dark red, coroll tube and labellum lightred. Aerial roots very long as is *H. Pininga*"). Mt. Kendeng (BEUMÉE, Sept. 1918).

Banten, (Harriang?) (v. HASSELT!, spec. auth. in Herb. L. B!).

Sumatra: Nature-reserve Sibolangit, 350 M. rare. (LÖRZING 5864, 13. 7. 18. „Hard herb elevated on 1 M. long aerial roots, 2—3 M. high. Leaves green, backside brighter. Spikes 100—130 mm. long, turbinate rounded above, dark purple or rose, with pale bordered bract saccate, resembling *Zingiber spectabile*. Bracts obovate-oblong (40—60 mm. × 20—30 mm.) with a 10 mm. broad base. Bracteole 12½—15 mm. long. Flowers one at a time opened rose-coloured, 65—75 mm. long. Calyx tubular, dilated (unto 8 mm.) to the top, bilobed with a cucullate tooth near the top of each lobe. Coroll-lobes dark purple (15 × 15 mm.). Labellum 15—20 × 14—17 mm.) connate with the filament, endlobe small (bifid?), sidelobes broad"). FORBES sine numero, K. SCHUMANN l. c.)

Borneo. (BECCARI, K. SCHUMANN l. c.).

Explication of Plates.

Plate 9.

Hornstedtia elongata K. Schum., teratological ovary.

Fig. 9. Intraovarial pistillum, detached from the ovary, with membranaceous rudiment of stigma, enl.—Fig. 10. Part of intraov. pistil from another ovary with a

fleshy cupuliform stigma, enl.—Fig. 11. Longitudinal section through an ovary showing base of intraov. pistil springing from the axis, enl.—Fig. 12. Transversal section of ovary near its base, in one of the cells a section of the descending branch of the intraovar. pistil, enl.—Fig. 13. Same, a little higher, central ax is beginning to detach from the placenta, enl.—Fig. 14. Same a little higher, the placenta is retiring from the central axis.

Plate 10.

Hornstedtia, details of flower.

Hornstedtia scyphifera Steud.

Fig. 1. Flower laid open, showing rudiments of staminodes, n. s.—Fig. 2. Stamen, from a bud, enl.—Fig. 3. Calyx and ovary from a decayed flower, n. s.

Hornstedtia Pininga Val.

Fig. 4. Stamen, enl.—Fig. 5. Flower laid open, n. s.

Hornstedtia reticosa Val.

Fig. 6. Flower, n. s.—Fig. 7. and 8. Labellum with the anterior petals.—Fig. 9. and 10. Stamen.

Hornstedtia mollis Val.

Fig. 11.—Flower, laid open, n. s.—Fig. 12. Idem, seen from front, n. s.—Fig. 13. Flower limb in a young state, n. s.—Fig. 14. Same of an older flower, n. s.

Hornstedtia villosa Val.

Fig. 15. Young flower, n. s.—Fig. 16. Limb laid open, dorsal petal not visible, n. s.

Plate 11.

Hornstedtia lycostoma K. Sch.

Fig. 1. Inflorescence, n. s.—Fig. 2. Flower in front and from above (drawing a little schemazed), n.s.—Fig. 3. Bracteole, n.s.—Fig. 4. Flower, laid open, n.s.—Fig. 5. Calyx n.s.—Fig. 6. Bud, enclosed by the calyx, n. s.—Fig. 7. Anther in front, enl.—Fig. 8. Anther backside, enl.—Fig. 9. and 10. Stigma, enl.

Plate 12.

Hornstedtia cyathifera Val.

Fig. 1. Part of rhizome with inflorescences, n. s.—Fig. 2. Flower from side, n. s.—Fig. 3. Flower explanate, the anterior petals not visible being covered by the lip, n. s.—Fig. 4. Anther, enl.—Fig. 5. and 6. Stigma, enl.—Fig. 7. Nectary, enl.

Plate 13.

H, rubra Val.

Fig. 1. A rather small inflorescence, n. s.—Other infl. on the some stock reach a length of 180 mm., of which 110 come on the scape.—Fig. 2. Bracteole, n. s.—Ftg. 3. Flower, n. s.—Fig. 4. Flower laid open, with the calyx (the latter unduly enlargened by the artist).—Fig. 5. Flower laid open, the petals artificially loosened at their base, n.s.—Fig. 6. Petals, n. s.—Fig. 7. Part of the faux with the sessile anther, enl.—Fig. 8. Nectary, enl.—Fig. 9. Flowering bract, n. s.—Fig. 10. Outer bract, n. s.

Fig. 1, 2, 8 and 9 are drawn from dried material, Fig. 3—7 from materials preserved in alcohol.

SUR LA LAUROTÉTANINE

l'alcaloïde tétanisant de diverses Lauracées

par

K. GORTER

La laurotétanine a été découverte dans la *Litsea chrysocoma Bl.* par *M. Greshoff* qui [1]) la décrit comme une base cristallisée soluble dans la potasse caustique, se colorant avec le réactif de *Fröhde* en un bleu magnifique tandis que le réactif d' *Erdmann* (acide sulfurique avec des traces d'acide azotique) donne une coloration bleue virant au brun. Seulement, si l'acide sulfurique contient une trop forte proportion d'acide azotique, il se colore, dès le début, en rouge brun. Administrée à des animaux par voie sous-cutanée la laurotétanine provoque des convulsions tétaniques.

Il semble que le même alcaloïde se rencontre, - à en juger sur les caractères indiqués, - dans plusieurs Lauracées; *M. Greshoff* fait mention des espèces suivantes:

Actinodaphne procera Nees.
Caryodaphne laevigata Bl.
Cassytha filiformis L.
Cinnamomum citriodorum Thw.
Cryptocarya tomentosa Bl.
Litsea amara Bl (= Tetranthera amara Nees).
  „ chrysocoma Bl.
  „ cubeba Pers. [2]) (L. citrata Bl; Tetranthera citrata Nees).
  „ intermedia Boerl. (Tetranthera intermedia Bl).
  „ javanica Bl.
  „ lancifolia Hooker f (Tetranthera chrysantha Bl).
  „ latifolia Bl.
  „ lucida Boerl. (Tetranthera lucida Hassk.)
Notaphoebe umbelliflora Bl.
Illigera pulchra Bl.

Cette dernière plante appartient à la famille des *Hernandiacées*, très proche parente des Lauracées.

Plus tard, *M. Filippo* [3]) a fait de cette base intéressante une étude détaillée, dont voici les résultats principaux :

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[1]) Verslag v/h onderzoek n/d Plantenstoffen van N. I. 1890/98 D. chem. G. 23 (1890) 3537.

[2]) Philippine J. of Science. Vol. XV. 235.

[3]) Arch. Pharm. 236 (1898). 601 Thèse Marbourg 1898.

La laurotétanine forme des aiguilles légèrement jaunâtres, très solubles dans l'alcool, le chloroforme, l'acétone, l'éther acétique, moins dans l'éther et le benzène, très peu dans l'eau; elle fond à 134°. C'est une base dextrogyre, facilement décomposable et énergiquement réductrice qui se dissout, d'après *M. Filippo*, non seulement dans la potasse caustique, comme *M. Greshoff* l'affirme, mais aussi dans l'ammoniaque. L'acide sulfurique seul produit, si l'on chauffe, une coloration bleue virant au violet; en présence d'acide vanadique ou molybdique, elle donne un bleu indigo.

M. Filippo a proposé pour la laurotétanine qu'il croit anhydre, la formule $C_{19}H_{23}NO_5$ et en a décrit les sels suivants:

Le chlorhydrate : $C_{19}H_{23}NO_5 . HCl + 6\ H_2O$
Le bromhydrate : — $. HBr + 2\ H_2O$
L' iodhydrate : — $. HJ + 2\ H_2O$
Le sulfate : (— $)_2 , H_2SO_4 + 5\ H_2O$
Le picrate : — $. C_6H_2(NO_2)_3\ OH$

La laurotétanine est une base secondaire donnant par l'action du phénylsénévol en solution alcoolique une thiourée fondant à 211-12°. Chauffée en tubes scellés à 100° avec de l'iodure d'éthyle, elle donne l‘éthyllaurotétanine fondant à 127-30° et dont l‘iodhydrate fond à 212°.

L‘hydroxylamine et la phénylhydrazine sont sans action; il semble donc que la laurotétanine ne renferme pas de groupement carbonyle. L‘acide iodhydrique, par contre, enlève de l‘iodure de méthyle; on a établi par la méthode de *Zeisel* la présence, dans la molécule de trois groupements méthoxyle.

En outre, la laurotétanine donne avec le chlorure de benzoyle une substance fusible à 194° que *M. Filippo* considère comme le dérivé dibenzoylé; en présence de ce résultat, il lui semble probable que la laurotétanine contient deux groupements oxhydryle. Il oublie cependant que, dans les conditions de son expérience, le groupement NH prend aussi part à la réaction en fixant un groupe benzoyle à l'azote, de sorte que, même si le produit obtenu par lui a été dibenzoylé, cela démontre tout au plus la présence, dans la molécule, d'un seul groupement oxhydryle. La fonction d'un atome d'oxygène reste donc parfaitement inconnue.

C'est là, dans les recherches de *M. Filippo*, un point faible qui, avant tout, doit être éclairci. Pour cela, une nouvelle étude de la laurotétanine était nécessaire; elle a projeté une tout autre lumière sur la question.

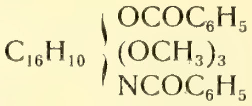
L'analyse de la base, séchée sur l'acide sulfurique, m'a donné des chiffres qui concordent bien avec la formule $C_{19}H_{23}NO_5$ proposée par *M. Filippo*, mais cette substance n'est pas anhydre comme ce savant l'a admis; bien au contraire, à 80°, dans le vide, sur l'anhydride phosphorique, elle perd une molécule d'eau de cristallisation, de sorte que la laurotétanine anhydre répond à la formule $C_{19}H_{21}NO_4$. Cette formule a été vérifiée par l'analyse de la phénylthiourée qui présente une différence de 2.2% dans le carbone selon qu'elle dérive de $C_{19}H_{23}NO_5$ (d'après *Filippo*) ou de $C_{19}H_{21}NO_4$ (d'après *Gorter*). L'analyse a décidé en faveur de la derniére conception.

Il en est de même des sels de la laurotétanine; j'ai pu établir que les formules de *M. Filippo* ne répondent pas à la réalité et qu'elles doivent être remplacées par les suivantes:

Le chlorhydrate: $C_{19}H_{21}NO_4 . HCl + 6 H_2O$
Le bromhydrate: --- $HBr + 6 H_2O$
L'iodhydrate : --- $HJ + 5 H_2O$
Le sulfate : (--- $)_2 H_2SO_4 + 5 H_2O$ (ou 12 H_2O)
Le picrate : --- $C_6H_2(NO_2)_3OH + 1\frac{1}{2} H_2O$.

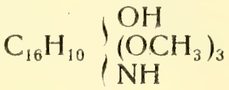
Il est donc hors de doute que la laurotétanine anhydre répond à la formule $C_{19}H_{21}NO_4$. Des quatre atomes d'oxygène trois sont contenus d'après l'expérience de *M. Filippo*, dans des groupements méthoxyle. Reste encore un seul atome d'oxygène qui a une fonction phénolique.

Les résultats de la benzoylation et de la méthylation sont d'accord avec la formule adoptée. Traitée par l'anhydride benzoïque, la laurotétanine m'a donné un dérivé dibenzoylé en aiguilles soyeuses fondant à 169--70° et répondant à la composition:

I 

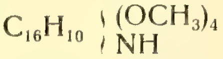
$$C_{16}H_{10} \left\{ \begin{array}{l} OCOC_6H_5 \\ (OCH_3)_3 \\ NCOC_6H_5 \end{array} \right.$$

La laurotétanine elle-même devient alors:

II 

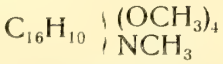
$$C_{16}H_{10} \left\{ \begin{array}{l} OH \\ (OCH_3)_3 \\ NH \end{array} \right.$$

Par méthylation à l'aide de diazométhane naissant, elle se transforme en éther méthylique:

III 

$$C_{16}H_{10} \left\{ \begin{array}{l} (OCH_3)_4 \\ NH \end{array} \right.$$

Celui-ci, à l'inverse de la laurotétanine, n'est pas soluble dans les alcalis et constitue une base amorphe et secondaire dont le groupement NH n'est pas entré en réaction. S'il en était autrement, on se trouverait en présence d'une base:

IV 

$$C_{16}H_{10} \left\{ \begin{array}{l} (OCH_3)_4 \\ NCH_3 \end{array} \right.$$

dont la formule appartient à la glaucine aussi bien qu'à l'éther diméthylique de la corytubérine.

Or le pouvoir rotatoire de la corytubérine est, d'après *M. Gadamer* [1]), $[\alpha]_D = + 282.65$ (en solution alcoolique) et celui de la laurotétanine comme je l'ai trouvé moi-même, $[\alpha]_D = + 98.5$ chiffre qui s'accorde, mal avec l'hypothèse que cette dernière substance pourrait se transformer par simple méthylation, en éther diméthylique de corytubérine. En revanche, le pouvoir rotatoire de la glaucine [2]), -- $[\alpha]_D = + 114.1$, -- est du même ordre de grandeur que celui de la laurotétanine. Rien ne s'oppose donc, de ce côté, à supposer qu'il existe des relations étroites entre la laurotétanine et la glaucine.

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[1]) Arch. Pharm. 240 (1902), 105.
[2]) — — 239 (1901), 431.

Examinons de plus près cette hypothèse. Ce qui frappe d'abord, quand on compare les propriétés de ces deux alcaloïdes, c'est qu'ils donnent des colorations analogues, d'une grande sensibilité, avec les réactifs suivants:

Réactions colorées

	de la glaucine d'après *Gadamer* 1)	de la laurotétanine d'après *Gorter*
Acide sulf. conc.	Bleu clair qui, à 100°, passe bientôt au bleu foncé et au violet.	de même
R. de *Fröhde*	D'abord bleu clair, puis bleu foncé; passe, en commençant par les bords, au violet, puis au brun; prend une teinte olivâtre, au bout de 4 heures.	D'abord bleu indigo, puis vert qui bientôt passe au violet.
R. d'*Erdmann*	Bleu clair; devint, au bout d'une 1/2 heure, d'un rose violet clair, en commençant per les bords; est, au bout de quelques heures, d'un rouge sale tirant sur le violet.	Bleu ciel qui passe au violet, en commençant par les bords.

En outre, la laurotétanine a une grande ressemblance avec la glaucine en ce qu'elle prend, au bout de quelque temps, une teinte rouge-brune au contact de l'air, tout comme on l'observe avec la glaucine 2) et ses sels.

Finalement, l'action pharmacologique de la laurotétanine est très semblable à celle de la glaucine,comme le tableau suivant le fait ressortir.

Action pharmacologique

de la glaucine d'après *M. Hans Meyer* 3)	de la laurotétanine résumée par l'auteur, d'après les protocoles de *M. Filippo* 4)
La glaucine produit, sur les grenouilles, une narcose légère, suivie d'une augmentation de l'excitabilité réflexe. Chez les mammifères, une narcose légère est suivie de crampes épileptiformes qui se prolongent, avec de petits intervalles, pendant des heures. La glaucine exerce une action paralysante sur le coeur.	La laurotétanine produit, sur les grenouilles, une narcose légère semblable à celle des alcaloïdes de l'opium. Avec des doses moyennes, il résulte un état de contracture; puis, des crampes tétaniques se produisent. Le pouvoir réactionnel du coeur est affaibli jusqu' à inhibition complète. Le protocole d'un essai sur une poule contient également un indice d'une narcose légère; puis des crampes épileptiformes se produisent.

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1) Arch. Pharm. 249 (1911). 229
2) — — 239 (1901). 430
3) — — 239 (1901). 408
4) Thèse Marbourg (1898).

En se basant sur les faits précédents, on pouvait penser que l'éther méthylique de l'az-méthyllaurotétanine, qui s'obtient facilement en faisant réagir le diazométhane en solution éthérée sur la laurotétanine, prouverait être identique à la glaucine. En effet, il présente la plus grande ressemblance avec cette dernière substance; il fournit, comme la glaucine, un chlorhydrate soluble dans le chloroforme; son pouvoir rotatoire est à peu près égal à celui de la glaucine et notamment, les deux alcaloïdes donnent les mêmes réactions colorées. Il frappa cependant que la première substance fournit facilement un hydrate cristallisant avec 3 H_2O, tandis qu'on ne connaît pas une glaucine hydratée.

En présence de ce fait, il était très probable que la glaucine est seulement isomérique avec l'éther méthylique de l'az-méthyllaurotétanine qu'il convient, pour cela, de nommer isoglaucine. Je me suis assuré de l'exactitude de ma thèse par les observations suivantes:

1°. Un échantillon de glaucine que je dois à l'obligeance de *M. Gadamer*, professeur à l'Université de *Marbourg (Hesse)* ne m'a pas donné un hydrate par addition d'ammoniaque à la solution étendue de son chlorhydrate. Dans des conditions analogues, l'isoglaucine se dépose en petites plaques sous forme de losanges avec trois molécules d'eau; avec la glaucine il n'y a rien de pareil.

2° Le l-bitartrate d'isoglaucine est très caractéristique, quand on le fait recristalliser dans l'eau, d'où il se dépose en paillettes fusibles à 204°, contenant 3 mol. d'eau; deux d'entre elles s'échappent à 80° dans le vide sur l'anhydride phosphorique, la troisième à 110°.

En revanche, le l-bitartrate de la glaucine se dépose dans l'eau en aiguilles concentriques et anhydres, fusibles à 203°; il abaisse le point de fusion du l-bitartrate d'isoglaucine.

3° L'iodométhylate d'isoglaucine abaisse le point de fusion de l'iodométhylate de glaucine; les deux alcaloïdes sont, en conséquence, différents.

Je résume, pour plus de clarté, les propriétés des deux alcaloïdes, côte à côte, dans le tableau ci-dessous.

	Isoglaucine	Glaucine
	Les réactions colorées se confondent pour les 2 alcaloïdes.	
Base libre. . . .	Hydrate + 3 H_2O F. (anhydre) à 90° $[\alpha]_D = +109°$	Anhydre F. à 119° $[\alpha]_D = +114.1°$ (*Fischer*[1]) 115.4 (*Gadamer*[2])
Chlorhydrate. . .	Soluble dans le $CHCl_3$ Hydrate + 2 H_2O (dans alc.-éth. acét) F. à 239°	de même. Hydrate + 3 H_2O (de même) F. à 232°
Bromhydrate. . .	F. à 252° en masse verdâtre	F. à 235 en masse verdâtre
1-bitartrate . . .	Hydrate + 3 H_2O F. à 204°	Anhydre F. à 203°
iodométhylate . .	F. à 229°	F. à 216°

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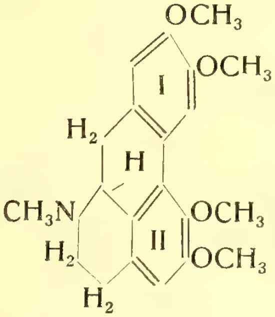
[1] Arch. Pharm. 239 (1901) 426.

[2] „ „ 249 (1911) 680.

On voit que les propriétés de la glaucine et celles de l'isoglaucine offrent le parallélisme le plus complet; nous en concluons qu'il existe, à n'en pas douter, des relations très étroites entre ces deux alcaloïdes. Ces relations paraissent le mieux s'expliquer, si l'on admet pour l'isoglaucine une structure analogue à celle de la glaucine, à tel point que la différence entre ces deux substances ne réside que dans les positions des méthoxyles. Or la constitution de la glaucine a été fixé d'une manière définitive par la synthèse qu'en a effectuée *M. Gadamer* [2]); ce savant lui a attribué la formule suivante

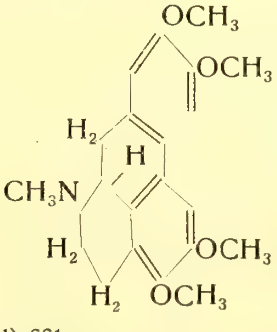
V



Reste à savoir dans quelles positions se trouvent alors les méthoxyles dans la molécule de l'isoglaucine. Remarquons, pour cela, que les réactions colorées qui se confondent pour la glaucine et l'isoglaucine, tendent à prouver l'absolue identité du noyau I dans la molécule des deux alcaloïdes, puisque ce sont, d'après *M. Gadamer* [1]), les positions 1. 4 libres qui doivent être tenues responsables pour les colorations intenses qui se produisent sous l'influence de divers réactifs. La différence entre la glaucine et l'isoglaucine ne peut donc résider que dans le noyau II, dans lequel les groupes méthoxyle doivent être arrangées d'une autre façon.

Or, l'oxydation manganique de la laurotétanine m'a donné de l'acide 1. 2. diméthoxybenzène-3. 4. 5. tricarbonique qui, le noyau II étant seul lié à trois atomes de carbone, ne peut avoir pris naissance qu'à partir de celui-ci D'autre part, le résultat de l'oxydation prouve que les méthoxyles dans ce noyau se trouvent en ortho, l'un par rapport à l' autre; conséquemment si, comme M. *Gadamer* [2]) l'a montré, la glaucine a la formule V, l'isoglaucine doit nécessairement être:

VI



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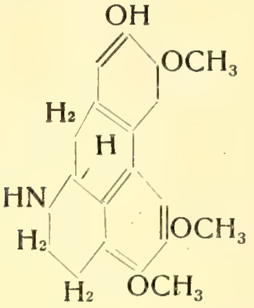
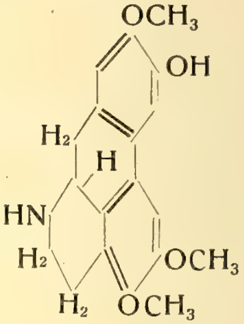
[1] Arch. Pharm. 249 (1911) 661.
[2] „ „ 249 (1911) 680.

Pour la laurotétanine nous avons alors encore le choix entre les deux formules suivantes:

VII



VIII



Partie Expérimentale.

L'écorce de la *Litsea cubeba* [1]) contient, en proportion notable, une huile essentielle qui peut être facilement entraînée par des vapeurs d'eau, 2 Kgr. de l'écorce, desséchés à l'air et traités de telle manière, nous ont donné, peu de temps après la récolte, 25 cc. de cette huile ($D\frac{25}{4} = 0.8802$), soit un rendement de 1. 1 %.

Pour préparer la laurotétanine, nous avons mis en oeuvre 50 Kgr. d'écorce en portions de 10 Kgr. que nous avons épuisés, dans un percolateur, avec de l'alcool à 95 %, sans avoir éliminée l'huile essentielle par distillation préalable.

Les liqueurs alcooliques ont été évaporées jusqu'à un liquide de consistance sirupeuse qu'on a extrait par l'acide chlorhydrique étendu à chaud. On a ensuite ajouté à la solution de l'ammoniaque en excès, après quoi, un précipité s'est déposé qu'on a recueilli et séché sur des pierres poreuses; puis, on l'a extrait par ébullition avec du chloroforme. Le filtrat a été épuisé de même en l'agitant, à trois reprises, avec le même dissolvant. Les solutions brunes chloroformiques, ainsi obtenues, ont été réunies et concentrées par distillation; puis on a passé l'alcaloïde par fractions dans de l'eau acidulée en agitant la solution, à dix reprises différentes, avec 200 cc. d'acide chlorhydrique à 0 3 %.

Les huit premières fractions sont de réaction neutre; elles contiennent la presque totalité de la laurotétanine avec des restes de cet alcaloïde dans la neuvième fraction qui, de même que la fraction suivante, est de réaction acide. La solution chloroformique, lavée comme je l'ai indiqué, laisse, par distillation, une quantité notable d'une matière brune résineuse qui a été négligée.

En procédant ainsi, on obtient des solutions aqueuses qui, alcalinisées par l'ammoniaque, ne donnent pas des émulsions gênantes, si on les agite à l'éther; bien au contraire, la couche éthérée se sépare presque aussitôt, ce qui est indispensable, attendu que la laurotétanine commence à cristalliser bien vite de la solution éthérée sous forme de petits prismes concentriques.

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[1]) M. J. C. VALETTE, ancien administrateur en chef des Plantations du *Pondok Gedeh*, et son successeur M. V. AHN m'ont très obligé en m'envoyant gracieusement la matière première, nécessaire à mes recherches; je tiens à leur exprimer ici mes vifs remerciements.

Pour préparer la laurotétanine, j'ai étendu chaque solution avec de l'eau jusqu' à 800 cc, j'y ai ajouté 600 cc d' éther et agité, après alcalinisation à l'ammoniaque; puis, j'ai répété l'extraction, à deux reprises, avec 300 cc d' éther. Le premier extrait éthéré, mis à part, commence, d'ordinaire, bientôt à séparer de la laurotétanine dont la quantité peut atteindre 2 gr. au bout de $1^1/_2$ heures. Les solutions éthérées ont été ensuite agitées, à deux reprises avec 20 cc. de soude caustique à $5^0/_0$; pendant cette opération, les bases phénoliques passent dans l'eau, d'où on les sépare, après dilution convenable et addition de 80 cc. d' une solution de chlorure d'ammonium à 5%, à l'aide d'éther qui, par distillation, abandonne la laurotétanine qu' on recristallise dans l'acétone. L'acétone mère a laissé de l'alcaloïde sirupeux qu'on transforme en sulfate et qu' on cristallise dans l'alcool, avant de le transformer en base libre par précipitation de la solution aqueuse au moyen d' ammoniaque en excès.

En procédant ainsi, le rendement, à partir de 10 Kgr d'écorce a été de 38 gr. de laurotétanine cristallisée; M. *Filippo* en a obtenu, autrefois, 50 gr. en partant de 20 Kgr. Nous n'avons pas rencontré d'autre base phénolique à côté de la laurotétanine.

Les solutions éthérées. traitées par la soude, devraient renfermer, le cas échéant les bases non phénoliques. On les a agitées avec de l'acide chlorhydrique étendu; la solution aqueuse ainsi obtenue, alcalinisée par la potasse, a été de nouveau épuisée à l'éther; celui--ci n' a laissé, par évaporation, qu'un très minime résidu amorphe, montant à peine à 0.2 gr.

Laurotétanine.

$$C_{19}H_{21}NO_4 + H_2O$$

Pour préparer la laurotétanine à l'état de pureté le mieux est de transformer d'abord l'alcaloïde dans son sulfate et de cristalliser celui-ci dans l'eau chaude. Le sulfate ainsi purifié donne, par décomposition à l'aide d'ammoniaque, de la laurotétanine pure qui se dissout parfaitement incolore dans l'alcool et dévie à droite le plan de polarisation. J'ai trouvé, dans une tube de 1 dM, $\alpha = 0.95$ pour une solution renfermant 0.965 gr. de laurotétanine anhydre dans 100 cc; donc $[\alpha]^{25}_{D} = 98.5$.

Au bout de quelques jours, la solution commence à jaunir et devient de plus en plus foncée.

Séchée dans le vide sulfurique, la laurotétanine ainsi obtenue renferme $\frac{1}{2}$ mol d'eau de cristallisation, elle ramollit vers 100° sans avoir un point de fusion bien net.

Analyse:

I. 0.1465 gr ont donné 0.3625 gr CO_2 et 0.0855 gr H_2O

II. 0.1390 --- --- --- 0 3450 --- --- --- 0.0855 --- ---

III. 0.1652 --- perdent, à 80 dans le vide sur l'anhydride phosphorique, 0.0042 gr

$C_{19}H_{21}NO_4 + {}^1/_2\,H_2O$. Calculé: C 67.9 H 6.5 $^1/_2\,H_2O$ 2.7

Trouvé: „ 67.5; 67.7; „ 6.5; 6.8; „ 2.5

0.1610 gr de la laurotétanine anhydre ont donné
0.4080 gr CO_2 et 0.0965 gr H_2O
$C_{19}H_{21}NO_4$. Calculé: C 69. 7; H 6.4
Trouvé : „ 69. 1; „ 6.7

Si l'on dissout, à chaud, la laurotétanine, encore humide, dans de l'acétone, on obtient, par refroidissement, de jolis petits prismes incolores qui, après peu de temps, se colorent en jaune clair; ils renferment une molecule d'eau de cristallisation et fondent à 125°, avec effervescence et perte d'eau de cristallisation, pendant que la substance fondue monte contre les parois du tube capillaire pour y glisser ensuite en formant, vers 134°, une gouttelette transparente. C'est cette dernière température que M. *Filippo* a indiqué comme point de fusion, ce qui, évidemment, est moins juste.

Analyse:

I. 0.1998 gr ont donné 0 4817 gr. CO_2 et 0.1220 gr. H_2O
II. 0.1554 -- -- -- 0.3775 -- -- -- 0.0946 -- --
III. 0.1806 -- -- perdu, à 80 dans le vide sur l'anhydride phosphorique, 0.0091 gr.

$C_{19}H_{21}NO_4 + H_2O$. Calculé: C 66.1 H 6.7 H_2O 5.2; N 4.06
Trouvé: „ 65.8; 66.2; „ 6.8; 6.8; „ 5.0; „ 4.18[1]

0.1715 gr de la laurotétanine anhydre ont donné 0.4365 gr. CO_2 et 0.1052 gr H_2O.
$C_{19}H_{21}NO_4$. Calculé: C 69.7; H 6.4
Trouvé: „ 69.4; „ 6.8

La laurotétanine, desséchée sur l'acide sulfurique, répond donc bien à la formule proposeé par M. *Filippo*. Cette substance n'est cependant pas anhydre comme cet auteur l'a supposé à cause de l'observation qu' elle ne perd pas de poids sur l'acide sulfurique. Bien au contraire, j'ai pu établir que le poids de la laurotétanine diminue, peu à peu, si on la chauffe à 80°, sous pression réduite, sur l'anhydride phosphorique et devient constant au bout de 24 heures. Dans ces conditions la substance prend, mais seulement à la surface, une coloration rouge sans autre altération appréciable; cela découle de l'observation que la laurotétanine, desséchée de la façon indiquée, donne, par addition de phénylsénévol à la solution alcoolique, une cristallisation abondante de la phénylthiourée fusible à 211-12°.

La laurotétanine est facilement soluble dans l'alcool, le chloroforme et l'éther acétique, moins dans l'éther et le benzène, très peu dans de l'eau; elle est assez soluble dans l'acétone pour la faire cristalliser dans ce dissolvant.

Elle est aisément soluble dans les alcalis fixes et ne peut être retirée de cette solution fluorescente en l'agitant à l'éther. Elle passe cependant dans ce dissolvant, si l'on ajoute du chlorure d'ammonium, au préalable; de cette façon, on a récupéré 0.18 gr en partant de 0.20 gr d'alcaloïde pur

En revanche, la laurotétanine n' est pas soluble dans le carbonate de potassium et dans l'ammonique, ce qui s'accorde avec sa nature phénolique.

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[1] *Filippo*. l. c.

Sa solution alcoolique donne, avec le perchlorure de fer officinal au centième, une coloration rouge violette. Si, par contre, on ajoute le même réactif à une solution étendue du chlorhydrate de laurotétanine, on observe une coloration verte et fugace, passant au rouge. En outre, le fait que cet alcaloïde donne une coloration rouge avec le réactif mercurique de *Millon*, démontre la présence, dans la molécule, d'une seule fonction phénolique [1].

La laurotétanine a tendance, de même que ses sels, à se colorer en brun au contact de l'air. Cette propriété n'est pas due à la fonction phénolique. puisque l'éther méthylique de la laurotétanine jouit encore de la même propriété.

La laurotétanine exerce, sur un certain nombre de corps une action réductrice. Ainsi M. *Filippo* [2] a déjà signalé que l'acide iodique, même en solution étendue, est réduit par une solution alcoolique de laurotétanine; de l'iode est mis en liberté et colore la liqueur en brun ou en jaune. En outre, cet auteur a observé la réduction, sous l'influence de la laurotétanine, de la liqueur cupro-potassique de *Fehling*, de l'azotate d'argent et du chlorure d'or.

La laurotétanine manifeste une action réductrice dans d'autres cas encore: elle réduit le permangate de potassium acidulé en produisant une coloration rouge-brune, Lorsqu' on ajoute un peu de chlorhydrate de laurotétanine à une solution mixte de chlorure ferrique et de ferricyanure de potassium, la liqueur se colore en bleu ou bien laisse déposer un précipité bleu.

Par contre, la laurotétanine est très stable vis-à-vis des réducteurs. Ainsi elle n'est pas attaquée, quand on la fait bouillir, pendant 3 heures, avec de l'acide chlorhydrique et de l'étain en grenaille.

Il en est de même pour la réduction électrolytique [3]. Nous avons dissous 1, 5 gr. de laurotétanine dans 40 cc. d' un mélange de 100 cc. d' acide sulfurique concentré et de 120 cc. d' eau; puis, nous avons introduit cette solution dans un vase poreux qui sert de compartiment négatif et qui plonge, à son tour, dans de l' acide sulfurique étendu avec de l' eau dans les proportions indiquées. La force électromotrice employée était de 4 volts, tandis que l' intensité du courant atteignait $2^1/_2$ ampères; les électrodes étaient en plomb En faisant passer le courant pendant $1^1/_2$ heures, la solution s' échauffe jusqu' à 30°; alcalisée ensuite par l' ammoniaque, elle a été épuisée au moyen d' éther qui, par distillation, a laissé un alcaloïde en tous points identique à la laurotétanine,

Il est donc bien certain, d' après les résultats mentionnés ci-dessus, que la laurotétanine, desséchée sur l' acide sulfurique, renferme encore une molécule d' eau de cristallisation. Cette constatation a de graves conséquences, puisqu' elle nous oblige à admettre que les sels de la laurotétanine dérivent de la formule $C_{19}H_{21}NO_4$; les analyses de M. *Filippo* ne sont cependant pas d' accord avec cette conception, à moins qu' on n' émette l' hypothèse fort peu vraisemblable que tous les sels analysés par lui, retiennent une molécule d'eau de cristallisalion.

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[1] Arch. Pharm. 228 (1890). 9

[2] „ „ 236 (1898). 608

[3] Cette expérience a été faite en 1913, pendant mon séjour en Hollande, au laboratoire de chimie organique de l' Université technique à Delft.

Il était donc bien nécessaire, après ce qui vient d'être dit, de préparer encore une fois les sels de la laurotétanine afin de vérifier les analyses de M. *Filippo.*

Avant d'aborder cette tâche, j'ai encore préparé la phényltniourée, provenant de l'action du phénylsénévol sur la laurotétanine en solution alcoolique Cette substance qu'on peut facilement obtenir à l'état pur par recristallisation dans l'alcool, peut très bien servir à vérifier la formule de la laurotétanine. En faisant cela, nous avons constaté par analyse que la thiourée ne répond pas à la formule $C_{26}H_{28}N_2SO_5$ que M. *Filippo* a proposée; bien au contraire, les résultats s'accordent avec la formule $C_{26}H_{26}N_2SO_4$, prouvant que la laurotétanine entre en réaction comme $C_{19}H_{21}NO_4$.

0.1225 gr, brûlé à l'aide de chromate de plomb, m'ont donné
0.3030 gr CO_2 et 0.0665 gr H_2O.

$C_{26}H_{28}N_2SO_5$ (d'apres *Filippo*). Calculé: C 65. 0; H 5.8; S 6.67
$C_{26}H_{26}N_2SO_4$ („ *Gorter*). „ : „ 67. 5; „ 5.6; „ 6.93
Trouvé: „ 67. 5; „ 6.0; „ 6.82 [1]

Passons maintenant à la description des sels de la laurotétanine qui ont été tous préparés en partant d'échantillons purs de cet alcaloïde fraîchement isolé au moyen d'éther et recristallisé dans l'acétone.

Le *chlorhydrate:* $C_{19}H_{21}NO_4 . HCl + 6H_2O$, a été préparé en dissolvant 6.5 gr de laurotétanine dans la quantité théorique d'acide chlorhydrique dilué. On a concentré convenablement la solution au bain-marie, puis on l'a fait cristalliser dans un exsiccateur. Les cristaux obtenus, recristallisés dans l'eau, se sont déposés en jolis prismes incolores qui sont stables à l'air et fondent à 48° dans leur eau de cristallisation; au bout de quelques jours seulement, ils prennent une teinte rousse, au contact de l'air. Le chlorhydrate peut être desséché, sans décomposition, dans le vide à 80° sur l'anhydride phosphorique.

I. 0.2180 gr ont ainsi perdu 0.0495 gr
II. 0.3665 -- -- -- -- 0.0830 --
III. 0.3315 -- -- -- -- 0.0740 --
IV. 0.2985 „ fondus avec précaution, avec un mélange sec de carbonate de sodium et d'azotate de potassium, puis dissous dans de l'eau et acidulés par l'acide azotique, ont donné, par addition d'azotate d'argent, 0.0910 gr AgCl.

$C_{19}H_{23}NO_5 . HCl + 6H_2O$ (*Filippo*). Calc. $6H_2O$ 22.1; Cl 7.25
$C_{19}H_{21}NO_4 . HCl + 6H_2O$ (*Gorter*). „ „ 22.9; „ 7.53
Trouvé. „ 22.7; 22. 7; 22.4; „ 7.54

Le *bromhydrate:* $C_{19}H_{21}NO_4 . HBr + 6H_2O$, s'obtient, de manière analogue, en prismes incolores qui roussissent au contact de l'air. Séchés entre du papier buvard, puis analysés au bout de 2 heures, ils possèdent 6 molécules d'eau de cristallisation.

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1) Filippo. l. c.

Analyse:

0.4035 gr ont perdu, à 80° dans le vide sur l'anhydride phosphorique, 0.0810 gr.

0.2656 gr. ont donné, selon la méthode décrite, 0.0975 gr. Ag Br

$C_{19}H_{21}NO_4$ HBr + 6 H_2O. Calculé 6 H_2O 20.9; Br 15.5
Trouvé „ 20.1; „ 15.6

L'analyse nous apprend que le bromhydrate, desséché de la manière indiquée, tend déjà à s'effleurir. En effet, les nombres trouvés font voir une faible perte en eau de cristallisation, tandis que, par conséquent, la teneur en brome a été trouvée un peu trop élevée. Ces différences s'accentuent pendant un séjour prolongé à l'air, de sorte que, au bout de cinq jours, trois molécules d'eau se sont échappées; le poids reste, dès lors, constant.

1.0.2268 gr. du sel ainsi séché, ont perdu 0.0250 gr.
11.0.2180 -- -- -- -- -- -- -- 0.0258 --

$C_{19}H_{21}NO_4$ HBr + 3 H_2O. Calculé: 3H_2O 11.7
Trouvé: -- 11.0; 11,8

M. *Filippo* n'a pas observé le sel à 6 mol. d'eau de cristallisation; après lui, le bromhydrate ne contiendrait que 2 mol. d'eau.

Le sel anhydre m'a donné à l'analyse les chiffres suivants:

1.0.1922 gr. ont donné 0.3940 gr. CO_2 et 0.0980 gr. H_2O
11.0 3210 -- -- -- selon la méthode décrite, 0.1475 gr. AgBr

$C_{19}H_{23}NO_5$ HBr (*Filippo*). Calculé: C 53,5; H 5.4; Br 18.8
$C_{19}H_{21}NO_4$ HBr (*Gorter*). „ : „ 55.9; „ 5.4; „ 19.6
Trouvé: „ 55.9; „ 5.6; „ 19.5

Comme on le voit, le résultat de l'analyse du bromhydrate anhydre ne concorde pas non plus avec la formule de M. *Filippo*.

L'iodhydrate: $C_{19}H_{21}NO_4$ HJ + 5 H_2O, constitue de beaux prismes incolores, assez solubles dans l'eau. Exposé à l'air, il perd la moitié de son eau de cristallisation.

0.2570 gr ont cédé à l'air, jusqu'à poids constant, 0.0205 gr.

$C_{19}H_{21}NO_4$ HJ + 5H_2O. Calculé: 2$^1/_2$ H_2O 8.2
Trouvé: „ 7.9

0 2570 gr. ont perdu à 80° dans le vide sur l'anhydride phosphorique, 0.0430 gr.

$C_{19}H_{21}NO_4$. HJ + 5H_2O. Calculé: 5H_2O 16.5
Trouvé: „ 16.7

0.1983 gr. du sel anhydre, incinérés avec du carbonate de sodium, puis dissous dans l'eau et acidulés par l'acide azotique, ont donné, par addition d'azotate d'argent, 0.1020 gr. AgJ

$C_{19}H_{23}NO_5$. HJ (*Filippo*). Calculé: J 26.9
$C_{19}H_{21}NO_4$. HJ (*Gorter*). „ „ 27.9
Trouvé: „ 27,8

Le *sulfate* se dépose de sa solution aqueuse soit en mamelons renfermant 12 molécules d'eau dont, au cours de 24 heures, 7 molécules s'échappent à l'air; soit en petites aiguilles concentriques renfermant 5 molécules d'eau. Il ne brunit pas, quand on le chauffe à 80° dans le vide sur l'anhydride phosphorique

0.3286 gr. du sel en mamelons ont perdu à l'air 0.0433 gr.
$(C_{19}H_{21}NO_4)_2$. $H_2SO + 12H_2O$. Calculé : 7 H_2O 13.0
Trouvé : „ 13.1

La même quantité de sulfate ensuite desséchée à 80° dans le vide sur l'annydride phosphorique, a perdu au total 0.0750 gr.
$(C_{19}H_{21}NO_4)_2$. $H_2SO_4 + 12H_2O$ Calculé 12 H_2O 22 3
Trouvé „ 22.8

0.2536 gr. du sel anhydre ont donné 0.0785 gr. $BaSO_4$
$(C_{19}H_{23}NO_5)_2$. H_2SO_4. (*Filippo*) Calculé : S 4.06
$(C_{19}H_{21}NO_4)_2$. H_2SO_4. (*Gorter*) „ „ 4.26
Trouvé „ 4.25

0.2556 gr. du sulfate en aiguilles ont perdu à 80° dans le vide sur l'anhydride phosphorique, 0.0270 gr.
$(C_{19}H_{23}NO_5)_2$. $H_2SO_4 + 5H_2O$. (*Filippo*) Calculé : 5 H_2O 10.3
$(C_{19}H_{21}NO_4)_2$. $H_2SO_4 + 5H_2O$. (*Gorter*) „ „ 10.7
Trouvé : „ 10.6

Le *picrate:* $C_{19}H_{21}NO_4$. $C_6H_2(NO_2)_3OH + 1^1/_2\ H_2O$, s'obtient en précipitant la solution de l'acétate de laurotétanine par l'acide picrique, sous la forme d'un précipité jaune qui se transforme rapidement en petites aiguilles rouges orangées. Recristallisées dans de l'eau chaude, celles-ci donnent de très belles aiguilles de la même couleur, ce qui est un indice de pureté.

Il me semble que M. *Filippo* qui, dans les mêmes conditions, a obtenu un précipité amorphe d'un brun jaunâtre, n'est pas parti, pour la préparation du picrate, d'un échantillon pur de laurotétanine. En outre, il est bien curieux que, par cristallisation dans l'eau chaude, il ait obtenu de fines aiguilles „jaunes".

A l'état pur, le picrate fond à 148° en se décomposant, si l'on ne monte pas trop lentement la température (environ 1° toutes les 5 secondes), sans quoi, il peut arriver que la substance noircit sans fondre.

Chauffé dans le vide à 80° sur l'anhydride phosphorique, la couleur vire en orangé avec perte d'eau de cristallisation.

1.0.2124 gr. perdirent 0.0100 gr.
11.0.2263 -- -- 0.0100 --
111.0.1770 -- -- 0.0085 --
$C_{19}H_{21}NO_4C_6H_2(NO_2)_3\ OH + 1^1/_2\ H_2O$. Calculé: $1^1/_2$ H_2O 4.6
Trouvé: „ 4.7; 4.5; 4.8

Le sel anhydre a donné à l' analyse les résultats suivants:
1.0.2024 gr ont donné 0.3390 gr CO_2 et 0.0900 gr H_2O
11.0.2163 -- -- -- 0.4225 -- -- -- 0.0930 -- --
111.0.1770 -- -- -- 0.3340 -- -- -- 0.0725 -- --
$C_{19}H_{23}NO_5$. $C_6H_2(NO_2)_3OH$ (*Filippo*) Calc. C 52.3 H 4.5
$C_{19}H_{21}NO_4$. $C_6H_2(NO_2)_3OH$ (*Gorter*) „ „ 53.9 „ 4.3
Trouv. „ 53.8; 53.3; 54.0 „ 4.9; 4.8; 4.8

En somme, il n'est pas douteux que la formule de M. *Filippo* doit être abandonnée en faveur de la formule $C_{19}H_{21}NO_4$. Cette dernière a été, du reste, confirmée encore par l'étude des produits de la benzoylation et de la méthylation.

Laurotétanine dibenzoylée.

$$C_{19}H_{19}NO_4\ (C_7H_5O)_2$$

Dans l'introducton à ce travail, nous avons déjà mis en doute l'assertion de M. *Filippo* qu'il aurait obtenu un dérivé dibenzoylé, - fusible à 194°, - en faisant agir, au bain-marie, du chlorure de benzoyle sur la laurotétanine

En fait, les résultats obtenus par cet auteur, sont sensiblement d'accord avec une laurotétanine monobenzoylée:

$C_{19}H_{20}NO_4\ (C_7H_5O)$ Calculé : C 72.4; H 5.8
Trouvé (*Filippo*): „ 71.8; 5.75

Le groupement benzoyle était certainement lié à l'azote, depuis que M. *Filippo* a montré que la substance ne pouvait plus se combiner avec le chlorure de platine et le chlorure d'or. Il faut donc admettre que, dans les conditions de cette expérience, l'oxhydryle phénolique est resté libre, d'où la nécessité de modifier de telle manière les conditions qu'un dérivé dibenzoylé puisse prendre naissance.

Pour cela, nous avons chauffe I gr de laurotétanine avec 2,5 gr d'anhydride benzoïque pendant 2 heures dans un bain d'huile à 160°. Le produit de la réaction a été traité, à la température ordinaire, pendant 24 heures, avec de l'ammoniaque à 2%; cristallisé ensuite dans l'alcool à 95%, il s'est déposé en petites aiguilles soyeuses qui fondent à 169--70° et qui, par conséquent, ne peuvent être indentiques à la substance benzoylée, fusible à 194°, que M. *Filippo* a eue entre les mains. En effet, nous avons pu établir que la nouvelle substance répond à la formule de la laurotétanine dibenzoylée.

1.0.1708 gr ont donné 0.4580 gr CO_2 et 0.0850 gr H_2O
11.0.1652 -- -- -- 0.4450 -- -- -- 0.0830 -- --
$C_{19}H_{19}NO_4\ (C_7H_5O)_2$. Calculé: C 74.0; H 5.4
Trouvé: „ 73.2; 73.4; „ 5.5;5 6

La laurotétanine dibenzoylée ne se dissout pas dans l'acide chlorhydrique étendu et ne donne pas, en solution alcoolique, de coloration avec le perchlorure de fer; elle ne contient donc plus d'oxhydryle phénolique libre. Elle est facilement soluble dans l'acétone, le benzène et l'éther acétique, peu soluble dans l'éther; la ligroine la dissout à chaud.

Éther méthylique de la Laurotétanine.

$$C_{20}H_{23}NO_4$$

La laurotétanine peut être transformée en éther méthylique par l'action du diazométhane naissant, en opérant comme suit:

On dissout 5. 5 gr. d'alcaloïde dans 25 cc. d'alcool méthylique refroidi à la glace et on ajoute d'abord 2 cc. de nitrosométhyluréthane, puis, goutte à goutte, et tout en agitant à la turbine, la quantité théorique (0.85 gr.) de potasse caustique dissoute dans l'alcool méthylique au dixième. La réaction s'effectue avec dégagement énergique d'azote; celui-ci terminé, on ajoute encore, successivement et peu à peu, les mêmes quantités de nitroso-méthyluréthane et de potasse, puis on met de côté le mélange jusqu'au lendemain.

On évapore alors l'alcool au bain-marie et on dissout le résidu dans de l'éther et de l'eau; la couche éthérée, desséchée sur la potasse, a laissé, par distillation, 3.8 gr. d'un sirop qui, dissout dans l'alcool, a déposé, par addition d'acide sulfurique, 2. 8 gr. d'un sulfate peu soluble. Recristallisé dans de l'eau, celui-ci se dépose en losanges possédant un angle aigu de 64°. La solution aqueuse renferme encore de la laurotétanine inaltérée qui peut être récupérée, après addition de chlorure d'ammonium, par extraction à l'éther.

Décomposé par la potasse, le sulfate a donné, à l'aide de l'éther, la base libre qui n'a pas cristallisé et qui, en solution alcoolique, est dextrogyre. Le chlorhydrate est peu soluble dans l'eau froide et soluble dans l'alcool. On l'a fait cristalliser dans l'eau chaude en paillettes fusibles à 245° en se décomposant. Desséchées à l'air, elles renferment encore $1^1/_2$ molécules d'eau de cristallisation.

0.1940 gr. ont perdu, à 80° dans le vide sur l'anhydride phosphorique 0.0137 gr.

0.1550 gr. ont donné, suivant la méthode de *Zeisel*, 0.3420 gr. AgJ

$C_{20}H_{23}NO_4$. HCl + $1^1/_2$ H_2O. Calculé: $1^1/_2$ H_2O 6.7; 4 CH_3O 30.5

Trouvé: „ „ 7.0; „ „ 29.1

0.1803 gr. du sel anhydre, brûlés à l'aide de chromate de plomb, ont donné 0.4187 gr. CO_2 et 0.1100 gr. H_2O

$C_{20}H_{23}NO_4$. HCl. Calculé: C 63.6; H 6.4

Trouvé: „ 63.3; „ 6.8

Le nouveau produit est donc l'éther monométhylique de la laurotétanine provenant de la méthylation de l'oxhydrile phénolique seul. Il est une base secondaire qui fournit avec le phénylsénévol, en solution alcoolique, une phénylthiourée; celle-ci a tendance à se séparer de sa solution concentrée sous une forme gélatineuse, amorphe. Pour cette raison, il convient de ne pas faire réagir les substances dans une solution trop concentrée. Recristallisée dans l'alcool, la thiourée se présente sous forme d'aiguilles qui fondent à 154-55°.

L'oxalate se dépose, si l'on ajoute de l'acide oxalique à la solution alcoolique de la base libre. Recristallisé dans l'eau bouillante, il se présente sous forme d'aiguilles anhydres, peu solubles à froid et fondant à 233° en se décomposant.

0.2192 gr. ont donné 0.0414 gr d'oxalate de calcium

$(C_{20}H_{23}NO_4)_2$. $C_2O_4H_2$. Calculé: $C_2O_4H_2$ 11.6

Trouvé: „ 11.6

Éther Méthylique de l'az-méthyllaurotétanine

Isoglaucine

$C_{21}H_{25}NO_4$

Contrairement à ce qu'on observe, quand on fait réagir du diazométnane naissant sur la laurotétanine, il est très curieux de constater que cet alcaloïde se transforme facilement et d'une manière quantitative en éther méthylique de l'az-méthyllaurotétanine, quand on le traite avec du diazométhane en solution éthérée.

Nous avons dissous, chaque fois, 2 gr. de laurotétanine dans 15 cc. d'alcool méthylique, puis nous avons ajouté 60 cc. d'une solution éthérée de diazométhane, préparée à partir de 6 cc. de nitrosomethyluréthane. La réaction s'effectue avec dégagement énergique d'azote; il est nécessaire de l'arrêter en temps propice afin d'éviter qu'elle pousse trop loin avec formation d'une base quaternaire. C'est pourquoi nous avons éliminé l'excès de diazométhane par distillation de la solution éthérée, au bout de $3^1/_2$ heures; le résidu dissous dans de l'acide chlorhydrique, puis alcalisé par la potasse, a cédé à l'éther 2 gr. d'un alcaloïde sirupeux d'un jaune clair qui s'obscurcit à l'air.

Pour purifier celui-ci, on l'a fait passer par le l-bitartrate (voir plus loin) qu'on a décomposé par la potasse, puis épuisé à l'éther. La solution éthérée abandonne, par distillation de l'éther, la base libre qu'on peut transformer facilement en hydrate cristallisé en ajoutant à la solution étendue du chlorhydrate de l'ammoniaque en excès. Au bout de 24 heures, l'isoglaucine hydratée s'est déposée en petites plaques sous forme de losanges qui fondent à63°; elles renferment trois molécules d'eau de cristallisation et répondent à la formule $C_{21}H_{25}NO_4 + 3\,H_2O$.

I. 0.230 gr. ont perdu, à 80 dans le vide sur l'anhydride phosphorique, 0.0300 gr.

II. 0,2090 gr. de l'alcaloïde anhydre ont donné 0.5470 gr. CO_2 et 0.1355 gr. H_2O.

$C_{21}H_{25}NO_4 + 3\,H_2O$. Calculé; $3H_2O$ 13.2
$C_{21}H_{25}NO_4$. „ : C 71.0; H 7.0
Trouvé: „ 12.6; „ 71.4; „ 7.2

Il n'est pas chose aussi facile d'obtenir l'isoglaucine sous forme de cristaux anhydres. Pour cela, il est indispensable de partir d'une solution de l'alcaloïde anhydre dans de l'éther absolu; si celle-ci contient encore de l'eau elle tend à séparer, notamment sur amorce, des tables de l'hydrate que je viens de décrire.

Pour convertir l'isoglaucine dans l'état cristallisé nous sommes parti d'un échantillon pur du l-bitartrate que nous avons décomposé par la potasse; la base libre, isolée à l'aide d'éther. puis desséchée dans le vide sulfurique, a été dissoute dans l'éther absolu et on a laissé lentement évaporer la solution dans un exsiccateur à paraffine. L'alcaloïde s'est déposé alors, peu à peu, sous forme de prismes réunis en faisceaux. Il fond à 90° et ne perd pas de poids quand on le chauffe à 80° dans le vide sur l'anhydride phosphorique.

Le pouvoir rotatoire dans l'alcool est inférieur à celui de la glaucine. Nous avons trouvé: $[\alpha]_D^{27} = +109.0$, ($\alpha = 2.33°$, c $= 2.15$, l $= 1$ dM.).

L'isoglaucine donne toutes les réactions colorées de la glaucine, si bien qu'on ne peut distinguer entre ces deux alcaloïdes à l'aide de réactifs colorants. Elle est distillable, sans altération, dans le vide.

Le *chlorhydrate* se dépose en aiguilles concentriques, par addition d'acide chlorhydrique à sa solution concentrée. Desséché à l'air, il contient 5 molécules d'eau de cristallisation.

0.2560 gr. perdent, à 80° dans le vide sur l'anhydride phosphorique, 0.0485 gr.

$C_{21}H_{25}NO_4 + 5\ H_2O$. Calculé: $5\ H_2O$ 18.7
Trouvé: „ 18.9

On l'obtient en aiguilles avec $2\ H_2O$, lorsqu'on ajoute 10 cc. d'éther acétique à une solution de 2 gr. du sel hydraté à $5\ H_2O$ dans 3 cc. d'alcool.

0,2260 gr. ont perdu dans le vide sulfurique 0.0185 gr.

$C_{21}H_{25}NO_4 + 2\ H_2O$. Calculé: $2\ H_2O$ 8.4
Trouvé: „ „ 8.2

Le chlorhydrate se dissout facilement dans le chloroforme; il fond, anhydre, à 239° en se décomposant.

Le *bromhydrate*, moins soluble que le chlorhydrate, se dépose dans l'eau chaude en prismes; il fond à 252° en se convertissant en masse verdâtre.

Le *l-bitartrate* se prépare en neutralisant, avec de l'acide l-tartrique, une solution de 5 gr. d'alcaloïde dans l'alcool absolu et en ajoutant ensuite encore la même quantité de cet acide; il ne tarde pas à se séparer. Au bout de 24 heures, on l'a recristallisé dans l'eau chaude, dans laquelle il se dépose en paillettes fusibles à 204° et contenant 3 mol d'eau. Le sel s'effleurit à l'air; à 80° dans le vide sur l'anhydride phosphorique, il ne perd que 2 molécules d'eau.

0.2470 gr. ont perdu 0.0160 gr.

$C_{21}H_{25}NO_4.\ C_4H_6O_6 + 3\ H_2O$. Calculé: $2\ H_2O$ 6.5
Trouvé: „ „ 6.5

La troisième molécule s'échappe, quand on chauffe la substance dans les mêmes conditions, à 110°; en vue de l'hygroscopicité du sel anhydre, il est nécessaire de faire cette dernière pesée en vase clos.

0.2470 gr. ont perdu alors 0.0245 gr.

$C_{21}H_{25}NO_4.\ C_4H_6O_6 + 3\ H_2O$. Calculé: $3\ H_2O$ 9.7
Trouvé: „ „ 9.9

0.1385 gr. du sel anhydre ont donné, par combustion, 0.2980 gr CO_2 et 0.0790 gr. H_2O

$C_{21}H_{25}NO_4.\ C_4H_6O_6$. Calculé: C 59.4; H 6.1
Trouvé: „ 58.7; „ 6.3

Le l-bitartrate d'isoglaucine est moins soluble dans l'eau (1.24: 100) que celui de la glaucine; aussi ce dernier sel se dépose en aiguilles anhydres fusibles à 203° qui abaissent le point de fusion du l-bitartrate d'isoglaucine. Les l-bitartrates se distinguent donc nettement entre eux.

L'*iodométhylate d'isoglaucine* s'obtient facilement par l'action de l'iodure de méthyle sur l'isoglaucine en solution méthylique. On l'extrait du résidu méthylique par l'eau chaude et on le fait cristalliser d'abord dans l'alcool, puis dans l'acide acétique à 10%.

L'iodométhylate ainsi préparé se présente en prismes trapus qui sont encore légèrement rougeâtres. Il fond à 229° en masse d'un vert foncé et est plus soluble dans l'alcool méthylique que le dérivé analogue de la glaucine. Son point de fusion est abaissé en mélange avec cette dernière substance.

L'oxydation manganique

de la laurotétanine m'a donné un acide tribasique en procédant comme suit. Nous avons dissous, à l'aide de potasse caustique, 3 gr. de laurotétanine dans 300 cc. d'eau, nous y avons ajouté, peu à peu, 450 cc. d'une solution de permanganate de potassium à 5%, puis nous avons chauffé le mélange au bain-marie bouillant jusqu'à décoloration complète. On a filtré, on a extrait deux fois, à l'eau chaude, le bioxyde de manganèse et on a mis en oeuvre, de la même façon, encore deux autres portions de 3 gr. de laurotétanine. Les filtrats réunis, provenant de 9 gr. de laurotétanine, ont été concentrés, après neutralisation par l'acide chlorhydrique, jusqu'à 150 cc. et puis rendus acides par de l'acide chlorhydrique. On les a épuisés maintes fois, au moyen d'éther, qui, par distillation, a laissé une masse cristalline constituée en partie d'acide oxalique. Nous avons dissous celle-ci dans 600 cc. d'eau, puis nous avons neutralisé, à chaud, avec du carbonate de calcium. Le filtrat a déposé, par évaporation au bain-marie, un sel calcique avec un rendement de 3.3 gr. qui, dissous dans de l'acide chlorhydrique, a donné, par extraction à l'éther, 2.25 gr. d'un acide qu'on purifie par addition d'acide chlorhydrique à la solution concentrée. On obtient ainsi des prismes incolores et anhydres fusibles à 165° en s'anhydrisant.

0.1220 gr. ont donné 0.2180 gr. CO_2 et 0.0415 gr. H_2O

$C_{11}H_{10}O_8$. Calculé : C 48.9; H 3.7

Trouvé : „ 48.7; „ 3.8

C'est un acide tribasique; 0.1515 gr. demandent, à leur neutralisation à la phtaléine, 16.8 cc. d'alcali n/10, nombre qui se confond avec la valeur théorique pour la formule $C_{11}H_{10}O_8$.

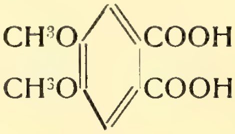
La *sel calcique* desséché à l'air, contient 3 Mol d'eau.

0.2375 gr. ont perdu, à 110° dans le vide sur l,anhydride phosphorique, 0.0180 gr.

$(C_{11}H_7O_8)_2 Ca_3 + 3 H_2O$. Calculé : 3 H_2O 7.6

Trouvé : „ 7.6

Chauffé dans un bain d'huile vers 250⁰, cet acide se scinde en acide carbonique et en anhydride métahémipinique qui a été mis en évidence par transformation en éthylimide. Pour cela, on a évaporé le produit de réaction avec une solution d'éthylamine au bain-marie; le résidu distillé dans le vide, puis recristallisé dans un mélange de pyridine et d'eau (1:4) m'a fourni de jolies aiguilles blanches qui fondent à 227⁰, point de fusion de la métahémipinimide éthylée. L'acide métahémipinique étant:



il en découle pour la formule de l'acide tribasique $C_{11}H_{10}O_8$ celle d'un acide 1.2--- diméthoxybenzène---3.4.5 tricarbonique.

Buitenzorg (Java), févr. 1921
Lab. de Phytochimie, du Jardin botanique.

REVISIO GENERIS AVICENNIAE

(cum annotationibus diversis)

auctore

R. C. BAKHUIZEN VAN DEN BRINK.

Introduction: The genus *Avicennia* was so called by LINNAEUS in honour of AVICENNA, the mediaeval name for the celebrated Arabian physician and philosopher ABU 'ALI AL-HUSAIN IBN 'ABDALLAH IBN SINA, in short IBN SINA, born in 980 at Afshena in the district of Bokhara, who died in June 1037 in his fifty-eighth year Hamadan in Persia. He wrote several philosophical and medical works, of which the Canon Medicinae (1023) was the most famous and at the same time the guide of medical study in European universities in the Middle Ages.

The oldest statements that have come to us, mention the *Avicennias* around the Red Sea and the Persian Gulf. (See BRETZL Bot Forsch. Alexanderzuges (1903)). Thus, an inscription from the Egyptian king ASSA (3580—3536 B. C.), found in the valley of Wadi Hamanat on the old caravan route between Coptos (mod. Kuft) and Kosseir, mentions mangroves on the Red Sea. Since *Rhizophora* does not occur further North than Massawa and the Dahlak Archipelago, this mangrove referred to here, can be nothing else but the *Avicennia*. Much later, ALEXANDER THE GREAT (* 356-- † 323 B. C.) led long expeditions to Arabia, the Persian Gulf and India. The botanical reports of these travels, i. e. those of NEARCHUS to the Persian Gulf (325---324 B. C.) and of ANDROSTHENES of Thasos to Tylos and the Bahrein-Islands (324--323 B. C.), have only partly come to us through THEOPHRASTUS (* Eresus in Lesbos 372-- † Athens 287 B. C.).

The plant system followed by THEOPHRASTUS in his „History of Plants" was founded principally on comparisons between the different forms, the habits and leaves of the plants known by him in the Mediterranean Sea; this example was also followed by the later Greeks. So, the *Avicennia* was pointed out to us, now with *Olives* (*'Ελάα* or *'Ελαία* = *Olea europea* L.), now with *Laurel* (*Daphnê* = *Δάφνη* = *Laurus nobilis* L. = also *Nerium oleander* L.), as it appears in the quotations from AGATHARCHIDES of Cnidus (± 140 B. C.) in STRABO's (born at Amasia in Pontus ± 63 — † ± 21 B.C.) work on geography.

As a collective work of general value for our subject, we can still use the „Traité des Simples" by IBN EL-BEITHAR († 1248) (see BRETZL l. c p. 72—76). Here also mention is made of *Avicennias* on the coasts of the Red Sea and the Persian Gulf, quoted from the works of different Arabian writers.

For India and Malaya, with regard to pre-Linnean writers, two famous works are especially pointed out to us; these are the „**Hortus Indicus Malabaricus**" by H. A. VAN RHEEDE TOT DRAAKESTEIN (* Jan. or Feb. 1637 — † 15 Dec. 1691), who pictured and described under the name „*Oepata*" (IV. (1683) p. 5 tab. 45.), *Avicennia officinalis* L.; and the „**Herbarium Amboinensis**" by RUMPHIUS (* May 1628 — † 15 June 1702), who under „*Mangium album*" (III (1750) p. 116 tab. 76) gave a picture and a description of one of the forms of *Avicennia marina* (FORSK.) VIERH.

The great confusion which has constantly prevailed in the determination of the right name for the species of the genus *Avicennia* L., began with LINNAEUS himself. The latter, judging from the description and the drawing of the „*Oepata*" (RHEEDE Hort. Mal. IV (1683) t. 45), called it *Avicennia officinalis* L. (Spec. Plant. I (1753) p. 110), referring to the description of the genus in the Flora Zeylanica (1748) p. 23. This name was later withdrawn and replaced by *Bontia germinans* L. (Spec. Plant. II (1763) p. 891); probably according to JACQUIN'S indications (Enum. Plant. Amer. (1760) p. 66), who considered the genus *Bontia* (LINN. Syst. A. P. 1122 ex JACQ.) as a synonym of his *Avicennia tomentosa* (JACQ. Stirp. Amer. Hist. (1763) p. 178). However, in the 3d edition of the Spec. Plant. (1764) p. 891, LINNAEUS withdrew this statement, saying himself that he followed anew JACQUIN'S indications. He gave again the generic name *Avicennia*, uniting *Avicennia* Flor. Zeyl. from Asia (called in 1753 *A. officinalis* L.) and *Avicennia tomentosa* JACQ. from America, under the new name *Avicennia germinans* L. Since LINNAEUS followed then JACQUIN'S data obviously (and actually had in his mind the American plant), the name *A. germinans* L. remains, notwithstanding the added quotations about the names of the Indian plants, as synonym to be attributed to *A. tomentosa* JACQ. from America. This fact was understood by LINNAEUS himself, who in the 6th edition of his Gen. Plant. (1764) p. 579 gave back to the American species its original name *Avicennia tomentosa* JACQ.

All these confusing changes in names have led astray the botanists who lived after LINNAEUS, so that for a long time *A tomentosa* L. was considered as the specific name for the Asiatic plant known as „*Oepata*". Here VAHL. (Symb. Bot. Plant. I (1790) p. 47), who thereby had in mind *Sceura marina* FORSK. of the Red Sea with small leaves and yellow flowers, seems to have been made the initiation. GMELIN (Syst. Nat. II 2 (1796) p. 963), and MURRAY / PERS. (Syst. Veg. XII (1797) p. 616), followed the example of LINNAEUS, by describing under the name of *A. tomentosa* JACQ. the American plant; WILLDENOW (Spec. Plant. III part I (1800) p. 395) on the contrary, unites the *Avicennias* of both Indias to *A. tomentosa* JACQ., on account of the similarity of the leaves of the plants figured by RHEEDE and JACQUIN; SCHAUER in DE CAND. Prod. Syst. Nat. (1847) p. 700 restores, it is true, the name *Avicennia officinalis* L., but describes under that name *A. alba* BL., for he says „ovario incluso ima basi glabro apice villoso, stigmatibus subsessilibus". He describes under the name of *A. tomentosa* a doubtful species which now makes us think of the Asiatic A. *marina*, („ovario stigmatibus subsessilibus"), now, through its white flowers, of the A. *nitida* JACQ. from America.- WIGHT (Icon. Plant. Ind Or. IV (1850) part III p. 16), was the first to correct the mistake, giving back to the „*Oepata* RHEEDE" the original name of A. *officinalis* L., while at the same time he recognized the small flowered A. *alba* BL. as being a separate species. CLARKE in HOOK. f. Flor. Brit. Ind., unites once more the two Asiatic species into one, the A. *officinalis* L., joining to it the A. *alba* BL as a small-flowered variety *alba* (BL.) CLARKE. Schimper („Die Indo-Malayische Strandflora" (1891) p. 98), decided to subdivide the A*vicennias* into three species, two of which were attributed to America, while the Asiatic species were brought back to a single one, the A. *officinalis* L. From many points of view this division appears to be incorrect. As one of the main differences between the Asiatic and the American plants, the dehiscence or indehiscence of the fruit on the tree was considered. This peculiarity, viz. of dehiscence of fruit on the tree, which is supposed to be the case for the American species, was also reported for the *Sceura marina* FORSK. growing around the Red Sea, while I observed it myself with the A. *alba* BL. (Tab, 14 q et r) This dehiscence occurs very easily, especially in damp weather before the falling off of the fruit. As a distinction between the groups of species, this peculiarity seems to me very insufficient. Neither does the division into two species of the American branch of A*vicennias*, in connection with pubescence or glabrousness of the interior of the corolla, and also the greater or smaller development of the style, seem to me quite sufficient. The concordance of characters of the A. *nitida* JACQ. with those of the A. *officinalis* L., that is to say, the general pubescence of the ovary and style, the nearly general pubescence of the hypocotyledons and the size of the seeds, is of more value in my opinion. At any rate, the A. *officinalis* L. differs at least as much; if not more from the A. *marina* (FORSK.) VIERH. as from the A *nitida* JACQ., while the differences between A. *marina* (FORSK.) VIERH. and A. *nitida* JACQ. are much smaller.

AVICENNIA L.

A*vicennia* LINN. Syst. Ed. I. (1735) p. 894; LINN. Gen. Plant. Ed. I (1737) p. 27; LINN. Gen. Plant. Ed. II (1742) p. 44 (!); LINN. Flor. Zeyl. (1748) p. 23 (!); JACQ. Selec. Stirp. Amer. (1763) p. 177 (!); LINN. Gen. Plant Ed. VI (1764) p. 579 (!); JUSS. Gen. Plant. (1774) p. 108; REICH. Gen. Plant. (1778) p. 328 (!); LAM. Enc. Méth. Bot. I (1783) p. 329 (!); JUSS. Gen. Plant Ed. Uster. (1791) p. 121 (!); WILLD. Linn. spec. Plant. III p. I (1800) p. 395 (!); PALIS. BEAUV Flor. d'Oware I (1894) p. 80; PERS. Syn. Plant. II (1807) p. 143 (!); R. BR. Prod. Flor. Nov. Holl. (1810) p. 518; BL. Bydr. Flor. Ned. Ind. 14e st. (1826) p. 820 (!); R. BR. Prod. Nov. Holl. Ed. II (1827) p. 374 (!); WALL. Plant. As. Rar. III (1832) p. 446 (!); R. BR. Verm. Bot. Schift. Ed. NEES AB ESENB. V (1834) p. 401 (!); ENDL. Gen. Plant (1836–1840) p. 638 No. 3722 (!); MEISN, Plant-

Vasc. Gen. II (1836—1843) p. 200 (!); Schau. in DC. Prod. Syst. Nat. XI (1847) p. 698 (!); Wight Icon. Plant. Ind. Orient. IV (1850) p. 1481 & 1842 (!); Schnitzl. Icon. II 1843--1870) p. 137* (!); Griff. in Trans. Linn. Soc. XX (1851) p. 1 (!); Schau. in Mart. Flor. Bras. IX (1851) p. 301 (!); Miq. Flor. Ned. Ind. II (1856) p. 911 (!); Agardh Theor. Syst. Plant. (1858) p. 121 (!); Bocquill. Groupe Verbén. (1861--1863) p. 11 (!); Hook. f. New Zeal. Flor. (1867) p. 224 (!); Benth. Flor. Austr. V. (1870) p. 69 (!); Brandis For. Flor. (1874) p. 371 (!); Benth. & Hook. Gen. Plant. II (1876) p. 1160 (!); Kurz For. Flor. Br. Burm. II (1877) p. 275 (!); Baker Flor. Maur. Seich. (1877) p. 256 (!); Boissier Flor. Orient. IV (1879) p. 536 (!); Treub Not. Embr. in Ann. Jard. Buitenz III (1883) p. 79 (!); Clarke in Hook. f. Flor. Brit. Ind. IV (1885) p. 604 (!); Bailey Syn. Queensl. Flor. (1883) p. 381 (!); Asa Gray Flor. North Amer. II. p. I (1886) p. 133 (!); Baill. Hist Plant. 11 (1891) p. 120 (!); Trimen Flor. Ceylon III (1895) p. 363 (!); Briq. in Engl. / Prantl. Nat. Pflanz. Fam. IV 3a (1897) p. 181 (!); Van Tieghem Avic. et Symph. in Journ. de Bot. XII (1898) p. 345 (!); Boerl. Handl. Flor. Ned. Ind. II (1899) p. 683 (!; Koord. / Val. Booms. Java Bydr 7 (1900) p. 215 (!); Briq in Engl./ Prantl. Nat. Pflanz. Fam. Nachtr. II (1900) p 67 (!); King / Gamble. Mat. Flor. Mal. Pen. (1904—1909) p. 1077 (!); Cheeseman Man. New. Zealand Flor. (1906) p. 566 (!); Cooke Flor. Pres. Bomb. II (1908) p. 435 (!); Muschler Man. Flor. Egypt. (1912) p. 812 (!); H. J. L. Verbenaceae Mal. Archip. Acad. Proefschr. (1919) p. 339 et pl. III (!); H. J. L. et Bakh. Rev. Verb. Bull. Jard. Bot. Sér. III vol. 3 fasc. 1 (Jan. 1921) p. 102;—*Bontia* Linn; Gen. Ed. I (1737) p. 180; Loefl. Iter. Hisp. (1758) p. 193; Linn. Spec. Plant. (1763) p. 891 n. 2 (!); Linn. Gen. Plant. (1764) p. 326 (!); S. Brown. Jam. 263; Burm. Flor. Ind. (1768) p. 138 (!);—*Anacardium* K. Bauhin Pin. Theatri Bot. (1623) p. 511 (!); K. Bauhin Hist. Plant. univers. I (1650) p. 334; S. Dale Pharmac. (1693) p. 339; K. Commelin Flor. Malab. (1696) p. 4 (!). E. Geoffroy Tract. Mat. Med. II (1741) p. 396;—*Donatia* Loefl. Iter. Hisp. (1758) p. 193;—*Upata* Adans. Fam. Plant. II (1763) p. 201;—*Sceura* Forsk. Flor. Aeg.-Arab. (1775) p. 37 (!);—*Racka* Bruce Trav. Abyss. et Nub. V (1790) App. p. 44; J. E. Gmel. Syst. (1791) p. 245 (!); Roem. & Schult. Syst. Veg. IV (1819) p. 13 et p. 207 (!);—*Halodendrum* Du petit thou. Gen. Nov. Madag. (1806) p. 8; Roem. & Schult. Syst. Veg. IV (1819) p. 34 (!);—*Halodendron* Roem. & Schult. Syst. Veg. IV (1819) p. 485 (!);—*Hilairanthus* van Tiegh. Avicenniacées et Symphorèmacées in Journ. de Bot. XII (1898) p. 357 et 358 (!).

Frutices, arbusculae aut arbores litorales inter tropicos totius orbis terrarum. Radices biformes, partim in lutum penetrantes, partim longe repentes ramosae, leviter submersae horizontales, extus spongiosae, intus tenaci-fibrosae, pneumatophora asparagiformia saepe furcata, 0 2--0.5 M. longa emittentes. Folia opposita basi interpetiolari-conjuncta, simplicia, integerrima, penninervia, subtus lepidibus minutissimis adpressis canescentia, coriacea. Cymae confertae pedunculatae in inflorescentiis terminalibus paniculiformibus dispositae; floribus oppositis, sessilibus; bracteolis bracteolulisque calyce brevioribus ei arcte appressis. Calyx profunde aequaliter quinquepartitus, persistens, fructifer immutatus, erectus, laciniis subovatis, obtusis, concavis, ciliatis, rigidis, imbricatis. Corolla decidua, hypogyna, sympetala, rigida, tubo brevi campanulato vel cylindraceo recto, superne ampliato, calycem subaequante, limbo subaequaliter quadrifido, vel segmento postico paullo latiore aut parum dissimili, laciniis aestivatione imbricatis, patentibus, subovatis. Stamina 4, corollae fauci incerta, cum lobis alternantia, subdidynama, breviter exserta, filamentis brevibus, subulatis, teretibus, glabris, rectis, patentibus, antheris basifixis, subrotundo-ovatis, a dorso compressis, loculis parallelis, longitudinaliter dehiscentibus. Ovarium superum, sessile, ovato-oblongum, sericeum et resiniferum, imperfecte biloculare, ovulis 4 oblongis ex apice columnae centralis pendulis, orthotropis, micropyle infera; stylo brevi vel subnullo, erecto, post anthesin paullo elongato, persistente; stigmate bifido. Fructus oblique ovatus, compressus, valvis 2 coriaceis, dehiscens, extus pulverulentus, endocarpio laevissimo argenteo-nitente; semen abortu plerumque unicum, embryone erecto, exalbuminoso nudo, cotyledonibus maximis, inaequalibus, carnosis, oblique reniformibus vel subcordatis, valde inaequalibus, laevibus, longitudinaliter conduplicatis, saturate viridibus vel viridi-purpurascentibus; radicula intra pericarpium pro germinans, longa et crassiusculo-cylindrica, apice pilis reduncis longis, mollibusque, densissime barbata, facie apicali glabra papillosa; plumula diphylla conspicua jam ante fructus casum accrescens.

Species 3 (vel 4?) maxime variabiles, per oram alluviam maritimam vigentes, quarum 2 in Africa orientali, Asia et Australia, et 1 (vel 2?) in America tropica, et Africa occidentali:

1. a. Corolla flava vel aurantiaca. Ovarium spurie quadriloculare, dissepimento imperfecto medio utrinque longitudinaliter alato, ovulis singulis inter alas. Plumula oculo nudo conspicua.— Africa orientalis, Asia et Australia. . . 2
b. Corolla alba. Ovarium imperfecte biloculari, ovulis utrinque binis, dissepimento non alato. Plumula minutissima.—America tropica et Africa occidentalis. 3
2. a. Flos expansus 0.25—0.5 c.M. diam, minus quam 0.6 c.M. longus. Ovarium imo basi glabrum apicem versus brevissime sericeum. Stylo glabro, stigmate manifesto, aequaliter obtuse bifido, accrescente cito recurvo, stylum aequante vel eo longiore. . . . . . . 1. **A. marina** (FORSK.) VIERH. s. l.
b. Flos expansus 1—1.5 c.M. diam, plus quam 0.6 c.M. longus. Ovarium totum longe sericeum, stylo villoso, stigmate subtabescenti, inaequaliter acute bifido, incurvo, quam stylus multo minore. . . . . 2. **A. officinalis** L.
3. a. Corolla intus velutino-tomentosa, stylo filiformi. . . 3. **A. nitida** JACQ.
b. Corolla intus glabra, stylo subnullo (species dubia). 4. **A. tomentosa** SCHAU.

1. AVICENNIA MARINA (FORSK.) VIERH.

Nom. et Syn.: *Avicennia marina* (FORSK.) VIERHAPPER Beitr. Kennt. Flor. Südarab. Socotra, etc. in Denkschr. Akad. Wissensch. Band. 71 (1907) p. 435 (!)-- *Avicennia resinifera* FORST. Plant. Escul. Ins. Ocean. Austr. (1786) p. 72; FORST. Flor. Ins. Austr. Prod. (1786) p. 45 (!); LINN. Syst. Nat. II 2 (1791) p 963 (!); WILLD Spec. Plant. III pars. I (1797 -

1830) p. 395 [!]; PERS. Syn. Plant. II (1807) p. 143 [!]; LAM. Enc. Méth. Suppl. I (1810) p. 539 [!]; RICH. Voy. l'Astrolabe (1832) p. 195 [!]; DECAISNE Herb. Timor (1836) p. 74 [!];-- *A. tomentosa* (non. L.) VAHL. Symb. Bot. Plant. I (1790) p. 47 [!]; SPRENG. Syst. Veg. II (1825) p. 768 [!]; R. BROWN. Prod. Flor. Nov. Holl Ed. NEES. AB ESENB I (1827) p. 374 [!]; DIETR. Syn. Plant. III (1843) p. 619 [!]; MIQ. in Linnaea 18 (1844) p. 264 [!]; WALP. Rep. Bot. Syst. IV (1844--1848) p. 133 ε *Arabica* et η *Australiasica* [!]; BLANCO Flor. Filip. Ed. II (1845) p. 353; HOOK. Bot. Antarc. Voy. II, Flor. N-Zél. (1853) p. 204 [!]; GRIFF. Not. Plant. Asiat. IV (1854) p. 185 [!]; NAVES. Flor. Filip. II (1878) p. 289 fig. 73 [!].-- *A. alba* BL. Bydr. Flor. Ned. Ind. 14e st. (1826) p. 821 [!]; DECAISNE Herb. Timor (1835) p. 74 [!]; DIETR. Syn. Plant. III (1843) p. 619 [!]; WIGHT Icon. Plant. Ind. Orient. IV (1850) p. 1482 [!]; WIGHT. III. Ind. Bot. II (1850) p. 217 [!]; MIQ. Flor. Ned. Ind. II. (1856) p. 913 [!]; KOORD./VAL. Booms. Java Bydr. 7 (1900) p. 221 [!]; COOKE Flor. Pres. Bombay (1908) p. 436 [!]; KING/GAMBLE Mat. Flor. Mal. Pen. (1909) p. 1078 [!];-- *A. nitida* (non JACQ.) THUNB. Flor. Java (1825) p. 15; THUNB. Flor. Ceil. (1825) p. 8; BLANCO Flor. Filip. Ed. I. (1837) p. 504 [!];-- *A. resinifera* GRIFF. in Trans. Linn. Soc. XX (1846) p. 6 tab. 1 [!]; GRIFF. Not. Plant. Asiat. IV (1854) p. 186 [!];-- *A. intermedia* GRIFF. in Trans. Linn. Soc. XX (1846) p. 6 tab. 1 [!]; SCHAU. in DE CAND. Prod. Syst. Nat. XI (1847) p. 700 [!]; SCHNITZL. II (1843--1870) p. et tab. 137 [!]; GRIFF. Not. Plant Asiat. IV (1854) p. 188 [!];-- *A. officinalis* (non L.) SCHAU. in DE CAND. Prod. Syst. Nat XI (1847) p. 700 [!]; SCHAU. in MART. Flor. Bras. IX (1851) p. 306 [!]; HOOK. f New Zeal. Flor. (1867) p. 224 [!]; Benth. Flor. Austr. V (1870) p. 69 [!]; BRANDIS For. Flor. (1874) p. 371 [!]; KURZ. For. Flor. Brit. Burma II (1877) p. 275 [!]; BAKER Flor. Maurit. Seychell. (1877) p. 257 [!]; BOISSIER Flor, Orient., IV. (1879) p 536 [!]; VATKE in Linnaea 43 (1880 – 1882) p, 539 [!]; TREUB. Not. l'Embr. etc. in Ann. Jard. Bot. Buitenz. III (1883) p. 79 [!]; CLARKE in HOOK. f. Flor. Brit. Ind IV (1885) p 604 var. *alba Bl.* [!]; F. V. MÜLLER Key Syst. Vict. Plant. I (1885 – 1888) p. 397 [!]; BALFOUR Bot. Socotra (1888) p. 237 [!]; WATT. Dict. Econ. Prod. Ind. I (1889) p. 360 [!]; KARSTEN Mangr Veg. Mal. Arch. (1891) p. 5, 20, 36, etc. et taf. VI. fig. 46, taf. VIII fig. 112—118, taf. X pl. 140 [!]; GÜRKE/VOLKENS Notizbl. II (1899) p 22, 173 et 174 [!]; BOERL Handl. Flor. Ned. Ind. II (1899) p. 667 et 683 [!]; BAILEY Queensl. Flor IV (1901) p. 1185 [!]; CHEESEMAN Man. New Zealand Flor. (1906) p. 566 [!]; VALET. Plant. Pap. in Bull. Dep. Agr. Ind. Néerl. X (1907) p. 53; var. *eucalyptifolia Val.* [!]; SIM For. Flor. and. For. Res. Port. East. Afr. (1909) p. 94 et pl. 83 [!], MUSCHLER Man. Flor. Egypt. I et II (1912) p. 813 [!]; KOORD. Atl. Baumart. Java II (1914) fig. 273 [!];— *A. eucalyptifolia* ZIPP. ex MIQ. Flor. Ned. Ind. II (1856) p. 912 sub *A. officinalis* L. [!]; et VALET. Plant. Pap. in Bull. Dep. Agr. Ind. Néerl. X (1907) p. 53 sub *A. officinalis* L. [!]; — *A. spicata* O. KTZE. Rev. Gen. Plant. II (1891) p. 502 [!];— *A. mindanaense* ELM. Leafl. Philipp. Bot. VIII (1915) p 2868 [!]; — *A. alba* BL. var. *acuminatissima* MERR. Philipp. Journ. Sc. C. Bot. XI. 6 (Nov. 1916) p. 311 [!];---

A. Rumphiana HALLIER. f. Med. Rijksherb. Leiden No. 37 (1918) p. 89 [!];— *Sceura marina* FORSK. Flor. Aegypt.-Arab. (1775) Cent. II p. 37 [!]; - *Racka torrida* BRUCE. Trav. Abyss. et Nub. V (1790) App. p. 44; J. F. GMEL. Syst. (1791) p. 245 [!]; ROEM. & SCHULT. Syst. Veg. IV (1819) p. 13 [!];—*Racka ovata* ROEM. & SCHULT. Syst. Veg. IV (1819) p. 207 [!];---*Halodendron* DU PETIT THOUARS. Gen. Nov. Madag. (1806) p. 8 No. 26; LAM. Enc. Méth. Suppl. V (1817) p. 698 [!]; ROEM. & SCHULT. Syst. Veg. IV (1819) p. 34 et 519 sub. *Avicenniae* [!];-- *Halodendron Thouarsi* ROEM. & SCHULT. Syst. Veg. III (1819) p. 485 [!];-- *Anacardium* BAUHIN. Pinax Theatri Bot. Ed. I (1623) et. II (1671) p. 511. V. [!];-- *Mangium album* RUMPH. Herb. Amb. III (1750) p. 116 tom. 76. (!).

Statio; Praecipue per oram maritimam in lutoso argillaceo salso solo, sub eo glarea, in propinque effluviorum et aesturiorum porro praeter salsos paludes et in silvis accessu maris expositis, altitudine maris 0--5 M., raro altiores.-- Inflor. et. Fruct.: Jan. -- Dec.

Distribution: East-Africa, Asia and Australia

Remarks.: *A. marina* (FORSK.) VIERH. (s. l.) is the most widely spread species in the genus Avicennia. It is extremely rich in forms, especially in what concerns the shape of the leaves; this variability has been the cause of a great number of names for this species. Although the flowers are always small, they can, it is true, differ a little from each other in size. The inflorescence is not less variable than the leaves; it can be composed either of spikes with many flowers, moderately long, often interrupted, or of small crowded heads.

1. a. Plantae Africae orientalis et Arabiae . . . α var. **typica** BAKH.
   b. Plantae Asiae et Australiae 2
2. a. Inflorescentia partialis elongata, subspicata, 0.5—2 c.M. longa, 10—30 flora. --Stylus brevissimus vel subnullus; fructus anguste spathulatus. . . . . β var. **alba** (BL.) BAKH.
   b. Inflorescentia partialis compacta, cephaloidea vel pyramidata, 0.5--1.2 c.M. longa, 2--12 flora. Flos expansus mediocris, 0.5—0.7 c. M. longus, 0.5—0.7 c.M. diam.; corolla tubo 0.3 c.M. longo, laciniis 2.5—3 c.M. longis, 0.2—0.25 c.M. latis; filamento 0.20—0.22 c.M. longo; anthera 0.10—0.12 c.M., pistillo tubo aequali vel vix longiore, conspicuo, stylo brevi, stigmate post corollae lapsum exserto.— 3
3. a. Folia elliptico-oblonga, apice acuminata, attenuata. . . . . γ var. **resinifera** (FORST.) BAKH.
   b. Folia rotundo-ovata, vel obovata, apice obtusa 4
4. a. Folia rotundo-ovata, basi obtusa vel rotundata, petiolo 0.5—1.2 c.M. longo . . . . δ var. **intermedia** (GRIFF.) BAKH.
   b. Folia obovata, basi attenuata, petiolo 1.5—3 c.M. longo. . . . . ε var. **Rumphiana** (HALL. f.) BAKH.

var. α **typica** BAKH.—(Descript. ex libr. div.)

Syn: *Sceura marina* FORSK. (1775); *Racka torrida* BRUCE (1790); *Halodendron* PET. THOU. (1806.); *Racka ovata* ROEM. & SCHULT. (1819); *Halodendron Thouarsi* ROEM & SCHULT. (1819); *Avicennia marina* (FORSK) VIERH. (1907).

Frutex vel arbuscula forma salicis, saepe arbor, ramosissimus, altitudine 2--8 M, crassitudine 0.5 M., cortice albo vel olivaceo, laevi. Rami juniores decussati, tenues quadrangulares, nodis incrassatis Folia ovata vel lanceolato-oblonga, utrinque acuta, in petiolum decurrentia, supra nitida, saturate viridia, subtus albida vel argenteo-nivea, 5--12 c.M. longa, 2.5--5 c.M. lata; petiolus brevis, dense tometosis, viridi-flavus. Inflorescentia terminalis, paniculiformis, subfoliosa, cymis pauci - vel multifloris, terminalibus et ad axillas superiores, solitariis aut geminatis, pedunculatis, summis glomeratis, pedunculis crassis, tomentosis, ticulatis, 2--2.5 c.M. longis, bracteola 1 et bracteolulis 2, brevibus, concavis, ovatis, obtusis vel subrotundatis, calyce brevioribus suffultis, flavis, dorso sericeis. Flores sessiles, parvi, suaveolentes. Calyx parvus, urceolatus, corollae fere longitudine, laciniis imbricatus, rotundo-ovatis, ciliatis, extus viridibus, mox scariosis, inferne dense tomentosis, 0.22--0.3 c.M. longis. Corolla parva, fulva, aurea vel aurantiaca, rigida, post anthesin nigra, decidua, tubo campanulato, calycem aequante vel eo breviore, laciniis ovatis vel rotundo-ovatis, radiatim patentibus, erecto-patulis, extus sericeis, intus glabris. Stamina brevissime exserta; filamentis brevibus, erectis; antheris subrotundis, compressis, filamentorum longitudine. Ovarium ovato-oblongum, villosum, basin tubi corollae implens; stylo filiforme, germine angustiore, duplo breviore (aut subnullo, secundum DU PETIT THOUARS et SIM.), laevi, flavo; stigmate manifesto, nunc longitudine styli, nunc eo brevissimo, subsessili, filiforme, obtuso. Fructus viridi flavescens, ovato-mucronatus, amygdalo immaturo similis, in arbore dehiscens. Semen unicum, magnum, compressum; cotyledonibus reniformibus, punctatis; radicula cylindrica, basi hirsuta; plumula oculo nudo conspicua, pilis albis longis hirsuta, curculo bifolio, lineari-lanceolato.

Remarks.: The *Sceura marina* FORSK. of the Red Sea and Arabia is commonly but incorrectly considered as a synoym of the *A. officinalis* L., and that because FORSKAL says about the style: „stylus germine angustior-filiformis." Not only is this elongated style to be found also in the *A. intermedia* GRIFF, but there seems clearly to be a closer relation to the *A. alba* BL., since FORSKAL speaks further of lanceolate pointed leaves, a glabrous style, well-developed, curved, obtuse stigmata and velvety peduncles.—Although the *Halodendron Thouarsi* ROEM. & SCHULT. of Madagascar and the *Sceura marina* FORSK. of the Red Sea and Arabia belong to the same species as the *A. alba* BL., I cannot decide here whether it should not be actually united, or remain separated in two varieties (var. α *typica* Bakh. and var. β *alba* (BL.) BAKH.), as I have still been obliged to do for lack of any specimens from Africa and Arabia.

Distribution: EAST-AFRICAN-COAST AND ARABIA: Cape town (HEMSLEY; SIM.); Port Natal (MEYER; BOISSIER; SIM.); Mosambique between Queriba and Inhambane (PETERS.); Madagascar and the Isl. Nosi Komba (PETIT. THOU.; VATKE); Mauritius and Seychelles (BAKER); Germ.-East-Africa and Zanzibar (GÜRK./VOLKENS; VATKE); Isl. Socotra (BALF.); Somali (THEOPHR.); Abessinia, Isl. Schech Said near Masawa and Dahlak-Arch. (THEOPHR; VATKE; SCHWEINF.); Red Sea (FORSK:; BOISSIER; SCHIMP.); Egypt

near Quesysum, Ras-el-Ginema (MUSCHLER), and Quadi Lechuma and Quadi Gemul (THEOPHR.; BOISSIER); Kosseir (THEOPHR.); Arabia (Dietr.); Carmania and Bahrein Isl. (Gulf of Persia—THEOPHR).

Vern.: EGYPT AND ARABIA: *Faladar* (Arab.— BAUHIN); *Germ* (Mascat—FORSK.), *Quorm* (Persian Gulf.—ABU HANIFA); *Schora*; *Schura*; *Shora*; *Choura* (Red Sea—IBN EL-BEITHAR; FORSK.; BOISSIER; MUSCHLER);— EAST-AFRICA: *Chobougi-Cuacuan*; *Cuancua*; *Imbeda*; *Imvetu*; *Mavete*; *M' Candella*; *Moosa* (Portug. Africa—SIM.); *Mtschu* (Kisuaheli, Germ. East-Afr.—GÜRKE); *Salgiero*; *Tobose*; *Tobucho*; *White Mangrove* (Portug. East-Afr.—SIM.); *Witte Mengerhout* (Capetown—SCHAU.).

Use: From the „*Traité des Simples*" by IBN EL-BEITHAR, the following is to be noticed about the *Avicennias* around the Persian Gulf and the Red Sea: „ABU HANIFA speaks of *Qorm* on the Gulf of Omân, the young shoots of which were eaten by the cattle and camels, while the wood was burnt as firewood; the leaves, if used, caused constipation."— *Le livre dit Er-Rihla* mentions the name „*Choura*" as being that of shrubs near the Sea of Hedjaz (Red Sea), the resin of which should be an aphrodisiac, and was also used against toothaches.— ABOUL ABBÂS EN-NEBÂTY mentions trees near the Red Sea, their habits, their leaves and flowers resembling those of the *Oleander*, whilst their fruit is said to be edible but causes dizziness. The resin, was used for (and burns like) incense and was called „Choura" by the Arabs; he further says that this resin is also used by them against toothaches."— FORSKAL says further of his *Sceura marina* that its young shoots are eaten by camels and sheep, while the wood is used fire-wood.

β var. **alba** (BL) BAKH.: (tab. 14 et 15).

Syn.: *Avicennia alba* BL. (1826); *A. resinifera* GRIFF. (1851); *A. officinalis* L. var. *alba* (BL.) CLARKE (1885); *A. spicata* O. KTZE. (1891).- *Anacardium* BAUHIN (1623)--

Arbuscula vel arbor, saepe e basi valde ramosa, jam a prima aetate florens, 5—20 M. alta, 0.1—0.5 M. diam., cortice amiantino vel betulino virescente, laevi, aetate progressa desquamante. Ramuli patentes, nutantes, teretes, laeves, novelli tomentosi regione florifera excepta glabrescentes, sparse resinoso-punctati, sparse obsolete lenticellati. Folia oblonga vel elliptico-lanceolata utrinque acuta, rarius apice subobtusa, margine vix recurvula, supra glabra, sub lente minutissime impresse glandulosa, nitidula, viridia, subtus argentea vel pulverulento-albicantia, in sicco albida vel cana, opaca, resinoso-punctata, costa adpresse tomentosa, nervis 7—15 utrinque reticulato-venosa, 3--16 c.M. longa, 1.5—5 c.M. lata; petiolus brevis dense pulverulento-tomentosus, 0.5—3 c.M longus. Inflorescentia terminalis, paniculiformis, fere decomposita, subfoliosa, 3—10 c.M. alta, 3--10 c.M. diam.; paniculae terminales et ex axillis foliorum superiorum, solitariae aut geminatae pedunculatae, ramis 1--3 pedunculatis; bracteis bracteolatis raro subfoliosis; inflorescentiae partiales spiciformes plus minusve densae et elongatae 0.5--2 c. M. longa, 0.7--1 c. M. latae, e floribus 10--

30 oppositis compositae; pedunculis quadrangularibus dense adpresse furfuraceis, cinerascentibus, saepe leviter aurantiaco-suffusis, sicco sulcatis, dense abscondite resinoso-punctatis et sparse obsolete glandulosis; brateolis parvis concavis sessilibus ovatis, obtusis, extus dense rufo-tomentosis, viridibus vel subaurantiacis, mox scariosis deciduis; bracteolulis 2, oblongis obtusis extus inferne furfuraceo-tomentellis, costa prominente, intus glabris vel medio sparse albo-pilosis, ciliatis, 0.3--0.5 c.M. longis, 0 2--0.3 c.M. latis. Flores sessiles, parvi, suaveolentes, 0.4--0.5 c.M longi, 0.5 c.M. diam. Calyx parvus, laciniis subinaequalibus, rotundo-ovatis, dense ciliatis, extus rugulosis, viridibus, mox scariosis, inferne dense albo-tomentosis, superne glabris, nitidis, intus glabris, lucescentibus, utrinque sparse resinoso-punctatis, 0.3--0.5 c.M. longis, 0 2--0.3 c. M. latis. Corolla parva, flava, crassiuscula, post anthesin delapsa, regularis, usque ad medium incisa, tubo campanulato vel cylindrico, calycem aequante vel breviore, extus glabro, 0,12--0.2 c.M. alto, fauci 0.15--0.2 c M diam.; laciniis uniformibus obtusiusculo-oblongis vel ligulatis, radiatim patentibus, extus densissime albo-lucescente villosis, intus glabris, 0.2--0.25 c.M. longis, 0.15--02 c.M. latis. Stamina vix exserta corollae laciniis multo breviora, 0.15--0.2 c M longa; filamentis brevibus, 0.5--0.7 c.M. longis; antheris minimis, subrotundis, flavis mox nigris, 0,07--0.1 c M. diam.; pollinis albis. Pistillum tubo brevior, corollae in fauce immersum. Ovarium ovoideum vel oblongum, imo basi glabrum apicem versus pilis appressis albidis dense vestitum dense resinoso-punctatum, imperfecte biloculare, dissepimento apicem non attingente, medio longitudinaliter alato, ovulis singulis inter alas; stylo brevissimo vel subnullo basi subcontracto, glabro, post anthesin subimmutato, calyce incluso, 0.05 --0 15 c.M. longo; stigmate manifesto, aequaliter bifido, cruribus post anthesin accrescentibus cito recurvis, calycem aequante aut vix exsertis. Fructus mediocris, viridiflavescens, oblique conoideus, apice angustatus vel obverse spathulatus, a latere compressus, post delapsum excrescens; cotyledonibus mediocribus subcordatis, viridi purpurascentibus, 2.5--3.5 cM longus, 1.2--2 c.M. latus. Plantula novella viride purpurascens, hypocotyledoni parvo vel mediocro, tereti cylindraceo, ultimo basis densissime sublonge setaceis reduncis, ceterum glaberrimo; foliis primariis mediocribus, oblongis vel obovatis apice obtusis vel rotundatis.

Remarks: Description according to living-plants from Java.— This variety is very constant and can only show a few differences in the size of the leaves. It is immediately recognizable by its appearance like a Willow, the white silvery under-surface of the leaves, its rich inflorescence consisting of straight spikes, but especially from the conical form of the fruit and the seedlings. The seeds may be found sprouting in the full fruiting season (Febr., March-in Java), drifting in great quantities in the marshes of the beach, or scattered along the coast. Wherever they agglomerate, they may form bunches with their roots strongly entangled, resembling a monstruosity which is called in Dutch „RATTENKONING” (rats'-king), and consists of a number of young rats with strongly intertwisted tails. Another time they may form

long strings, united by fibrous remnants of plants. The hypocotyls of the seedlings are provided with well-developed, hooked hairs which by cluching into another cause the agglomeration of the young plants, above mentioned, who do not easely separate. (Tab. 15 a et b.) The first little leaves of the seedlings, with their violet-brown cotyledons and petioles, in total opposition with the later lanceolate, pointed leaves of the full-grown tree are oval or oblong, often even obovate, always obtuse or rounded at their top, (tab. 15 d), and generally of a slight purple hue.

Distribution: Brit-India from Sind to Malacca; Malayan Archipelago; Philippines; Nova-Guinea; Polynesia--China.

Vern: *Api-api* (Java, Sumatra, Borneo, Bali, etc.); *Bani* or *Bina* (Bengal--Watt.); *Bities* (Tandjoeng Pandan, Biliton--TEYSM.); *Bowak daoen ketjil* (Timor--TEYSM.); *Djambéj* (Ins. Way, Atjeh--KOORD. ; *Dudhi Bàen* or *Dudli Bàen* (Sundribuns, Bengal--PRAIN, etc.); *Faba Malaccana* (Portug.--BAUHIN); *Kajoe api-api* (Java, Sumatra, Borneo, etc.); *Kajoe bakan laki-laki* (Telok Betong, Sumatra--GUSDORF); *Kaisseru* (Finshafen, Kais, Wilh. Land., N.-Guinea--SCHUM./LAUTERB.); *Kauwsia* (Alor-Isl.--TEYSM.); *Ki api-api* (Noesa Kambangan, Java--SCHEFF.); *Kowak* (Timor--TEYSM.); *Lameh* (Burma--WATT); *Mada* or *Nalla mada* (Tel. Bengal--GAMBLE); *Oepata* (Malabar--RHEEDE, WATT); *Padjapih* (Kp. Oedjoeng, Celebes-RACHMAD); *Renggouw* (Alor Isl.--TEYSM.); *Rosrosan* (Soebah, Pekalongan, Java-KOORD.); *Thamé* [Burma--KURZ]; *Tivar* [Bombay, Sind--WATT, COOKE]; *White Mangrove* [engl.].

Coll. Herb. Bog.

Java: Res. Bantam: Pasawoeran [BACKER No. 7293—18 Mrch. 1913; BACKER No. 7746—10 May 1914];— Res. Batavia: Batavia, Tandjoeng-Priok [VORDERMAN; HALLIER No. 163—12 Nov. 1894; BACKER--Aug. 1903; BACKER-Oct. 1904; BACKER No. 21443—27 Oct. 1916]; Maroenda [BAKH. No. 1718; 1719; 1720; 1721; 1722—11 Nov. 1917; BAKH. No. 1191—10 Febr. 1919; BAKH. No. 1172—2 Mrch 1919]; Batavia-Noord [BAKH. No. 2112—16 July 1919].— Res. Pekalongan: Soebah [KOORD. No. 13478--5 June 1893; KOORD. No. 25613—15 Apr. 1897];— Res. Banjoemas: Noesa Kambangan [SCHEFFER No. 11—5 Oct. 1871; KOORD. No. 9694—4 Dec. 1891; KOORD No. 9695--6 Dec. 1891; KOORD. No. 9696--14 Dec. 1891; KOORD. No. 13478—1893; KOORD: No. 24112--7 Sept. 1896; KOORD. No. 22009-- 13 Jan. 1898; No. 20022---13 Jan. 1898].-- Kangean-Arch. Kali Sangka, Kangean (BACKER No. 26991--15 Mrch. 1919);

Bali: Rapalagoeng [BECKING No. 39.--Mrch. 1920];

Sumatra: Balokan. Ins. Way, Atjeh [KOORD. No. 10591--17 Febr. 1890; KOORD. No. 10592--9 Febr. 1890]; Lampongsche Distr.: Telok Betong [GUSDORF No. 8--25 Oct. 1913]; Belawan [LÖRZING No. 6029--1 Sept. 1918; Pantei-tjermin, Serdang [Lörzing No. 7285--21 Mrch. 1920];

Banka: Poeloe Nanas, Klabatbaai [TEYSM.-- 1857]--Biliton Tandjoeng Pandan [TEYSM];

Borneo: Sampanahar, Sepoea [LABOHM No. X]; Plechari [LABOHM No. 1964--30 May 1919; Baharoe, Kota Baroe [BOSCHWEZEN No. 1974--17 June 1919];

Celebes: Saleyer [TEYSM. No. 13766]; Kp. Wadjo [NOERKAS, exp. v. VUUREN No. 58--12 Mrch 1912; RACHMAD, exp. v. VUUREN No. 357--30 July 1913];

N. Guinea: Andai [TEYSM. No 7459]; Kaiser Wilhelmsland [HELLWIG No. 212--7 Jan. 1889];

Philippines: Mindanao [HUTCHINSON No. 3947-- Mrch 1916];

Brit.-India: Singapore [RIDLEY-- May 1892]; Amherst, Tenasserim [FALCONER No. 2415]; Bengal, Sundribuns [PRAIN- 5 August. 1902].

Use: The wood is used everywhere by the people living on the coast and sailors as fire-wood, for which reason the plant has been named A*pi-api*. More seldom one finds the wood being mentioned as being used for building purposes, especially for the interior of houses, or as in Borneo (according to LABOHM) in the mines; according to KURZ, it has been used in the Andaman Islands for rice-mills and rice-stampers. The fruit is often eaten by the inhabitants of the coast, and this not only in times when food is scarce, as it has been often claimed.-- According to fishermen of Tandjong-Priok, Batavia, the seeds are first well-cooked for this purpose, then dried in the sun, and only after this operation are they eaten in the state of pulp. The seeds of the var. *alba* (BL.) BAKH. and also those. of the *A. officinalis* L. seem to be the most suitable for that purpose, according to native saying; those of the var. *intermedia* [GRIFF.] BAKH. are considered inferior; at any rate they have to remain a long time (one week) submerged in water before being suitable for consumption. According to LINSCHOTEN [part. 4. Ind. Or. C. 29], ex BAUHIN, the unripe fruit is preserved by the natives either in salt or vinegar.

γ var. **resinifera** [FORST.] BAKH. [Tab. 16].

Syn.: *Avicennia resinifera* FORST. [1786]; *A. eucalyptifolia* ZIPP. ex MIQ. et VAL., et *A. officinalis* L. var. *eucalyptifolia* [ZIPP.] VAL. [1907]; *A. mindanaense* ELM. [1915]; *A. alba* BL. var. *acuminatissima* MERR. [1916].--

Folia elliptico-oblonga, 5-multoties longiora, utrinque attenuata subtus viridi-canescentia, 7--16.5 c. M. longa, infra medium 1.5--3.5 c.M. lata; petiolo 1--1.5 c.M. longo. Panicula parva, foliata, non vix ramosa, bracteolis subfoliaceis saepe involutis. Inflorescentia partialis compacta, cephaloidea vel pyramidata, 0.5--1.2 c.M. longa, 2--12 flora. Flores expansi mediocres, 0.5--0.7 c.M. longi, 0.5--0.7 c M. diam. Corolla tubo 0.3 c.M. longo; laciniis 2.5--3 c.M. longis, 0 2--0.25 c.M. latis. Stamina filamentis 0.20--0.22 c.M. longis; antheris 0.10--0.12 c.M. diam Pistillum corollae tubo aequale vel vix longius, conspicuum. Ovarium brevi tomentosum; stylo brevi; stigmate post corollae lapsum exserto. Fructus ovoideus.-- Cetera varietate β similia.

Remarks. Description exclusively made after dried material.--This variety approaches the var. *alba* [BL.] BAKH. because of the shape of the leaves; but it differs from it especially in having the axillary and terminal inflorescences consisting of capitules; the bracts are less developed, generally curved, little leaves. [See also H. J. LAM. Verb. pl. III fig. 1, p-t]. The appearance of these curved bracts is indeed a characteristic of the entire capitate group.--The name *A. resinifera* was given by FORSTER on account of the supposed formation of resin in these trees According to CHEESEMAN, this affirmation is erroneous, and this resin must have been the edible *kaurigum* of the Maoris, which comes from the *Agathis australis* SALISB. (COWRIESPRUCE). The *Avicennia*-trunk secretes in fact some resin, possibly only by a wound, as I observed myself at Tandjong-Priok with the var. *intermedia* [GRIFF]. BAKH.—HEYNE in Nutt. Plant. Ned. Ind. IV [1917] p. 124; speaks on BOORSMA's authority, of tough, odoriferous and bitter resin which is used to prevent pregnancy, a remedy which is supposed to be harmless also when used continuously. Arabian writers too, speaking of *Avicennias* along the coast of Arabia, mention very often indeed the resin formed by these trees.

Distrib.: Australia: Victoria; N.-S. Wales; Queensland [BENTH., CHEES.]; New-Zealand [FORST.; RICH; HOOK.]; N-Caledonia and Galapagos [HEMSL.]; N.-Guinea [VALETON, PULLE];-- Moluccas: Ambon [ROBINSON]; Timor [DECAISNE];-- Biliton (TEYSM.);--Philippines: Mindanao and Panay.

Vern.: *Bootharoo* [Australia-- BAILLY]; *Brappat* [Ambon--ROBINSON]; *Daon kajuh buluh ajam* [Timor-- HALL. f.]; *Egate*; *E-pumeran* [Australia--BAILEY]; *Kaloh* [Gelieb, N. Guinea--BRANDERHORST); *Kum moo-roo* [Australia--BAILEY]; *Maraban* [Philipp.--ELMER]; *Malacca Bean* [engl..-- EWART-DAVIES]; *Manaoua* or *Manawa* [Australia-- BAILEY]; *Mangi-mangi* [Ambon--ROBINSON]; *Mangrove* [Australia--CHEES.]; *Parpoon*; *Rhai-ite*; *Tagon-tagon*; *Tchunt-chee* [Australia--BAILEY]; *White Mangrove* [Australia--EWART & DAVIES].

Coll. Herb. Bog.:

Australia: Rockhampton [D].;

N.-Guinea: Gelieb [BRANDERH. No. 227—13 Nov. 1907]; Merauke [JAHERI-- 15 April 1901; KOCH-- 8 Oct. 1904; VERSTEEG No. 1893--6 Nov. 1907];

Moluccas: Ambon [ROBINSON No. 1862—29 Nov. 1913 *A. alba var. acuminatissima* MERR.]; Ins. Taliaboe [ATJÉ exp. HULSTIJN No. 114—1917];

Philippines: Mindanao [ELMER No. 11990- Oct. 1909]; Panay (CURRAN No. 17337- Aug. 1909).

Use: According to BAILEY the wood is strong, hard and durable, for which reason it is used in Australia for different purposes; besides the fruit is eaten toasted. The planting of it is recommended against coasterosion.

δ var. **intermedia** [GRIFF.] BAKH.— (Tab. 17 et 18).

Syn.: *Avicennia alba* [non BL.] WIGHT. (1850); *Avicennia intermedia* GRIFF. [1856].

Folia rotundo-ovata vel oblongo, 1½—4-- plo longiore, basi obtusa vel rotundata, apice obtusa, raro brevi acuminata, subtus albido-virescentia, 3—8 c.M. longa, medio vel vix infra 2—4 c.M. lata; petiolo 0.5--1.2 c.M. longo. Panicula parva, foliata, bracteis foliaceis. Ovarium brevi-tomentosum. Fructus subparvus, amydalinus vel lato-ovatus, a latere compressus, apice obtusus vel rotundatus, 1.5—3 c. M. longus, 1.5—2 c. M. latus; cotyledonibus subparvis reniformibus, atroviridibus. Plantula novella viridis, foliis primariis parvis, anguste lanceolatis vel subobovatis apice obtusis vel rotundatis; setis reduncis e basi hypocotyledonis brevibus. – Cetera varietate γ similia.

Remarks: Description according to living material from Java, compared with the herbaria in Herb Bog.-- This variety, which occurs in the Sunda Archipelago especially, was called by GRIFFITH a form between the two forms described by him, i. e: A. *resinifera* [non FORST.] GRIFF. = var *alba* [BL.] BAKH., and A. *obovata* GRIFF. = A. *officinalis* L. In inflorescence and flowers it agrees with the var. *resinifera* [FORST.] BAKH.; it differs, however, in the shape of the leaves.-- The fruit is quite typical and very small for the genus, which RUMPHIUS had already observed in his *Mangium album* [var. *Rumphiana* [HALL. f.] BAKH]. The varieties „*alba*" and „*intermedia*" occur in Java, often mixed together; the var. *intermedia* is not only recognizable from the var. *alba* by the habit of the trees, the shape of the leaves and the inflorescence in capitules, but also distinctly by its seedlings (tab. 18). The cotyledons are reniform, and their colour light green; the base of the hypocotyl, provided with short hooked hairs is not much developed; for that reason it is seldom found in entanglements of seedlings, as is the case with the var. *alba*, in spite of the fact that one can find the seeds of this variety drifting in large quantities in the marshes, or along the beach submerged together. Besides the small stems of the seedlings are green just as the first leaves, these always remain small and have a striking white mid-nerve. The seedlings pictured in SCHIMPER, Indo Mal. Strandfl. tab. VI 2 and 3. belong to the variety *intermedia.*

As a curiosity let us further remark that there are sometimes to be found air-roots on *Avicennia* trunks (I saw this with the variety *intermedia*, but possibly the same occurs with other species or varieties). These air-roots are very similar to the breathing-roots, except that their direction is not negative-geotropic, but on the contrary they grow downwards. They occur along the stems up to a height of two meters, and if the trees are standing in an oblique position, one finds these roots on the lower side in a row close to each other. These air-roots remain short and thus do not reach the ground, but branch off. Within they are not spongy and fibrous like the breathing-roots, but ligneous. I mention this case for trees which stand on places where the marshes were filled up with sand, while the breathing-roots were more or less buried under the ground. Probably this abnormal formation of air-roots was due to the breathing, which was prevented by the sand filling in the marsh.

Distrib.: Tellichery, Malabar (WIGHT); Malacca (GRIFF.); Riouw (?); Sumatra; Banka; Borneo; Java; Ternate; N-Guinea; Moluccas; Celebes; Philippines.

Vern.: *Apé-àpé* (Kangean--Dommers); A*pi-api* (Java, Madoera, Sumatra, Banka); *Bajo* (Pasokan, Djapara, Java--KOORD.); *Hapi-hapi* (E. Java--KOORD.); *Kajoe neri* (Muntok, Banka--BÜNNEMEIJER ; *Kajoe tando* (Likoepang, Celebes--

FORSTEN); *Fika-fika* (Ternate--BEGUIN); *Tioes lèwo* (Menado, Poeloe baro, Celebes--KOORD).

Coll. Herb. Bog.:

Java: Res. Batavia: Batavia, Maroenda and Tandjong-Priok (BACKER--18 Jan. 1903; Aug. 1903; Aug. 1904; Oct. 1904); BACKER No. 21441--27 Oct. 1916; BAKH. No. 449-- 11 Nov. 1917; BAKH. No. 448--18 Nov. 1917; BAKH. No. 1189-- 10 Febr. 1919; BAKH. No. 1171-- 2 Mrch. 1919; BAKH. No. 2127; 2128— 16 July 1919; VORDERMAN--? 1910);-- Res. Priangan: Tjiletoe, Zandbaai (BAKH. No. 645-- 5 Aug. 1918);-Res. Cheribon: Kalidjohopekik (KOORD. No. 36596-- 30 Nov. 1905); Cheribon (BACKER No. 4698-- 17 Oct. 1912); Indramajoe (BACKER No. 16711-- 29 Sept. 1914);--Res. Semarang: Kendal (BACKER No. 16335-- 20 Sept. 1914); Semarang (TEYSM.); Tajoe (BEUMÉE No. A 127-- Dec. 1918); Pasokan, Djapara (KOORD. No. 9- 10 Jan. 1886); Ngarengan, Djapara (KOORD. No. 35729-- 27 May 1899);-- Res. Soerabaja: between Soerabaja and Grissee (BREMEKAMP-- 13 Dec 1916);--Res. Pasoeroean: Pasoeroean (VALETON No. 236-- Sept. 1890); Probolinggo (KOORD. No. 37868- 16 Oct. 1899);-- Res. Besoeki: Gradjagan, Banjoewangi (KOORD. No. 9701--10 June 1889);-- Res. Madoera (BACKER No. 19553— Sampang— 2 Mrch 1915; TEYSM No. 1753).--Kangean- Isl: Paliat (BACKER No. 29502-- 4 May 1919); Gelaman (DOMMERS No. 86— 29 Aug. 1920);

Sumatra: S. Oelar terbaoengan, Medan (LÖRZING No. 3831-- 30 May 1915);

Banka: Toboali (TEYSM.); Muntok (BÜNNEMEJER No.1528- 17 Oct.1917);

Borneo: P. Lemoekoetan (HALL. f. No. B. 281-- 3 Oct. 1893);

Celebes: Menado (KOORD. No. 19483-- 20 Apr. 1895); Baoeroeng Madjene (NOERKAS, exp. v. VUUREN No. 397-- 29 Juli 1912); Saleyer (TEYSM. No. 13791);

Ternate: (Beguin No. 932-- 13 Nov. 1920);

Moluccas: Poeloe Santari, Obi, (SAäNAN, exp. HULSTYN No. 59);

Philippines: Luzon (KLEMME No. 4278-- June 1906).

Use: According to RUMPHIUS, the wood was formerly sold as fire-wood by the Javanese to seamen. Near Tandjong-Priok, Batavia, the fruit is eaten in the state op pulp, after being first cooked and then dried.-- According to KOORDERS, near Banjoewangi, the fruit after being first cooked is then preserved.— One sees often small bushes planted along fish-ponds, in order to increase the strength of the dykes.

ε var. **Rumphiana** (HALL. f.) BAKH.-- (Tab. 19).

Syn.: *Avicennia Rumphiana* HALLIER f. (1918); A. *nitida* (non. JACQ.) BLANCO (1837); *A. tomentosa* (non. JACQ.) BLANCO (1845); *Mangium album* RUMPH. (1750).

Folia obovata, rarius suboblonga, submagna, *A. officinalis* L. conformia, latitudine supra medium maxima, 2--3plo longiore, basi attenuata, apice obtuso-rotundata, in sicco subtus rava vel vulva, 5--10 c.M. longa, 2.5--5 c.M. lata; petiolo 1.5--3 c M longo. Panicula parva, foliata; bracteis foliaceis. Ovarium subpilosum.-- Cetera varietate δ similia.

Remarks: Description exclusively made after dried material from Ternate, N.-Guinea, Ambon, the Philippines and Singapore, adding below particular quotations from other sources. By its large obovate leaves, this variety reminds one strongly of A. *officinalis* L.; it differs, however, especially with regard to the flowers. The most conspicuous differences between the var. *Rumphiana* (HALL. f.) BAKH. and A. *officinalis* L. are the following: Small branches, petiole, underside of the mid-nerve, peduncles etc. being covered with a thick (gray?) down; small foliate inflorescence, (without warty glands), consisting of small cymes in the shape of heads which are often in pairs in the axils of the leaves; and especially by the small flowers with their short or nearly wanting glabrous styles, the well-developed stigmata curved outwards, and the ovaries glabrous at the base. Undoubtedly this form belongs to *A. marina* (FORSK.) VIERH., though it is characteristic by the somewhat longer hairs of the ovary.

Distrib.: Ternate; N-Guinea; Ambon; Philippines; Singapore.

Vern.: *Affi-affi* (Ceram--RUMPH.); *Bungalol*; *Bungalon*; *Bunglo* (Cebu-BLANCO); *Caju api-api*; *Cuban* (Ambon--RUMPH); *Fika-fika* (Ternate-BEGUIN); *Mangi-mangi poeti* (Ambon--RUMPH); *Miapi*; *Piapi*; *Pipisic* (Philipp.--BLANCO); *Watta Cumban* (Ambon--RUMPH).

Coll. Herb. Bog:

Ternate: (BEGUIN No. 933--13 Nov. 1920);

N.-Guinea: Poeloe Rombobo, Salawati (TEYSM. No. 7795);

Moluccas: Ambon (ROBINSON No. 301--July/Nov. 1913);

Philippines: Mindanao (ELMER No. 10451a -- Apr. 1909; ELMER No. 12006 -- Oct. 1909; MIRANDA No. 18272-- May/June 1912; Palawan (CURRAN No. 3536-- Dec. 1905); Luzon (AHERN No. 148-- 1901/1902; AHERN No. 116Q-- 1901/1902; RAMOS No. 4954-- Dec. 1907); Negros (CURRAN No. 19385-- June 1910); Tayabas, Luzon (Merrill No. 583 Spec. Blanc.-- Apr. 1912);

Malacca: Singapore (WATSON AND BURKILL No. 3795-- 9 Aug. 1918).

2. AVICENNIA OFFICINALIS L.

(Tab. 20 et 21.)

Nom. et Syn: *Avicennia officinalis* LINN. Spec. Plant. I (1753) p. 110 [!]; WIGHT. Icon. Plant. Ind. Or. IV (1850) pl. 1481 [!]; WIGHT Ill. Ind. Bot. II (1850) p. 217 [!]; MIQ. Flor. Ned. Ind. IV (1885) p. 604 [!]; SCHIMPER Indo-Mal. Strandfl. (1891) p. 98 [!]; O. KUNTZE Rev. Gen. Plant. II (1891) p. 502 (part.) [!]; TRIMEN Flor. Ceylon III (1895) p. 363 [!]; KOORD./VAL. Booms. Java Bijdr. No. 7 (1900) p. 217 [!]; Cooke Flor. Pres. Bomb. II (1908) p. 435 [!]; KING/GAMBLE Flor. Mal. Pen. (1909) p. 1077 [!]; KOORD. Exk. Flor. Java III (1912) p. 139 (part.) [!]; KOORD. Atl. Baumart. Java II (1914) fig. 274 et 273 L [!]; H. J. LAM. Verbenaceae Mal. Arch. Proefschr. (1919) pl. III a. et b. [!];-- A. *tomentosa* (non JACQ) WILLD. Spec. Plant. III p. I (1800) p. 395 [!]; PERS. Syn. Plant. II (1807) p. 143 [!]; BLUME Bijdr. Flor. Ned. Ind. 14e st. (1826) p. 821 [!]; ROXB. Flor. Ind. III (1832) p. 88; WALL. Plant. Asiat. Rar. III (1832) p. 44 tab. 271 [!];

NEES ab ESENBECK: ROBERT BROWN'S Bot. Schrift. V (1834) p. 401 [!]; SCHNITZL. Icon. II (1843 -- 1870) pl. 137**, 1 -- 4 [!]; WALP. Rep Bot. Syst. IV. (1844 -- 1848) p. 131β *Asiatica* [!]; WIGHT Icon. Plant. Orient. IV (1830) p. 1481 [!]; WIGHT Ill. Ind. Bot. II (1850) p. 217 et pl. 173-b 10 [!]; ROXB. Flor. Ind. (1874) p. 487 [!]; KURZ For. Flor. Brit Burma II (1877) p. 276 [!]; MURRAY Plants and Drugs of Sind (1881) p. 176 [!]; WATT. Dict. Icon. Prod. Ind. I (1889) p. 361 [!];-- A. *Oepata* HAMILT. Comm. Hort. Malab. in Trans. Linn. Soc. XVII (1837) p. 221 [!];-- A. *obovata* GRIFF. Not. Plant. Asiat. IV (1854) p. 189 [!];-- *Avicennia* spec. LINN. Gen. Plant. (1742) p. 44 [!]; LINN. Flor. Zeyl. (1748) p. 23 [!];--*Anacardium* BAUHIN Pin. Theatr. (1671) p. 512 v. variat. in Malavar [!];-- *Anacardium orientale* JOUSTON Dendr. (1662) p. 156; PLUCKNET Almag. Bot. (1696--1700) p. 28;-- *Oepata* RHEEDE Hort. Malab. IV (1683) t. 45 [!]; RAJUS Hist. Plant. II. (1693) p. 1566 [!]; LINN. Flor. Zeyl. (1748) p. 23 sub. *Avicennia* [!]; HAMILT. Comm. Hort. Malab. in Trans Linn. Soc. XVII (1837) p. 221 [!].

Arbuscula vel arbor, saepe e basi valde ramosa, 5--25 M. alta, 0.10--1 M. diam. aut latiore, cortice betulino, exasperato, aetate progressa atrato, desquamante. Ramuli patentes, nutantes, teretes, laeves, novelli tomentosi glabrescentes, sparse resinoso-punctati, sparse lenticellati. Folia obovata, vel late-oblonga, basi subcuneata saepe rotundata, breviter in petiolum attenuata, apice rotundata, margine vix recurvula, supra glabra demum lucida, minutissime glandulosa, nitidula, atro-viridia, subtus appresse pulverulento-glaucescentia, in sicco saepe fulva, opaca, abscondite resinoso-punctata, costa subtus subglabra, elevata, nervis 5-15, obsolete reticulato-venosis; 4.-12 c.M. longa, 2.-6 c.M. lata, sapore amaro et subsalso; petiolus mediocris glabrescens, 0.5-2 c.M. longus. Inflorescentia terminalis, paniculata, bracteata raro subfoliosa, 3-15 c. M. longa, 10-15 c. M. diam.; paniculae terminales et ex axillis foliorum supremorum, solitariae aut geminatae pedunculatae, ramis 1-3 pedunculatis, cymis densis cephaloideis aut rarius elongatis dissiti-floris, 1-1.5 c.M. longis, 1-2 c.M. latis, e floribus 2-12 decussatis composita, pedunculis viridibus vel subfuscis obsolete quadrangularibus, dense appresse furfuraceis subglabrescentibus, dense resinoso-punctatis, et glandulis verrucosis dense adspersis, bracteis parvis, sessilibus rotundato-ovatis, extus a basi ad medium usque dense tomentosis apicem versus glabratis, viridibus mox atratis, scariosis deciduis, bracteolulis binis, rotundo-ovatis vel subreniformibus obtusis, extus rugosis, inferne usque ad medium dense tomentosis apicem versus glabris, lucidentibus, intus glabris, vel inferne albo-pilosis, utrimque resinoso-punctatis, ciliatis, 0.3-0.5 c.M. diam. Flores sessiles, pro genere magni, suaveolentes, 0.7-1 c. M. longi, 1.2-1.5 c. M. diam. Calyx persistens, magnus, laciniis subinaequalibus, rotundo-ovatis, subtrinervis, dense ciliatis, extus rugulosis, viridibus, mox scariosis, inferne dense albo-tomentosis, superne glabris, nitidis, intus glabris, lucescentibus, utrinque sparse resinoso-punctatis, 0.5-0.6 c.M. longis, 0.3-0.5 c.M. latis. Corolla pro genere magna, flava mox subaurantiaca, crassiuscula, post anthesin delapsa, subregularis, pro $^2/_3$ incisa, tubo campanulato, calycem aequale vel vix longiore, extus fere glabro; 0.2-0.4 c.M. longo, fauci 0.5-0.6 c.M. diam.; laciniis subinaequalibus, obtusiusculo-oblongis vel ligulatis, lobis subradialibus, retusis, postico patente latiore, apice breviter inciso, anticis 3 patentissimis aut reflexis, extus densissime albo-lucescente-villosis, margine bis 0.1 c.M. glabro, intus glabris, utrimque resinoso-punctatis, 0.3-0.5 c.M. longis, 0.3.-0.5 c.M. latis. Stamina breviter exserta corollae laciniis breviora, 0.2-0.4 c.M. longa, filamento mediocri, antheris submagnis, lato-oblongis fulvis mox piceo-atris, 0.1-0.12 c.M. diam., pollinis albis. Ovarium conicum, totum pilis appressis longis albidis vestitum, dense resinoso-punctatum; imperfecte biloculare, dissepimento apicem non attingente, medio longitudinaliter alato, ovulis singulis inter alas, stylo filiforme elongato, fere omnino dense breviter albo-tomentoso, resinoso-punctato, subadscendente, corollae tubo subadpresso, vix exserto, post anthesin excrescente, calyce longe exserto, 0.3—0.4 c.M. longo, stigmate subtabescenti, inaequaliter acute bifido, incurvo. Fructus magnus, viridi purpurascens, lato-ovatus vel amygdalinus, basi rotundatus vel subcordatus, a latere compressus, post delapsum excressens. Plantula novella viridis, plerumque viridi-purpurascens, foliis primariis mediocribus, anguste lanceolatis, utrimque attenuato-acutis, hypocotyledoni magno et crasso fere omnino densissime longe setaceo.

Remarks: Description according to living material from Java, compared with herbaria from the Herb. Bog.—The shape of the leaves of the *A. officinalis* L. is constant, i. e. large, oval, broad-elliptic or distinctly obovate with a rounded apex. Since however this also occurs with some varieties of the *A. marina* (FORSK.) VIERH., it is of poor comparative value as a mark of the species. The same objection could be made about the length of the style. The only characters for distinguishing the species are the large flowers with very pubescent ovary and style, and the undeveloped pointed unequal branches of the stigma. The fruit is very big and broad oval, sometimes slightly cordate and with an obtuse apex. The seedlings are robust and possess a strong, thick, almost entirely pubescent hypocotyl; the first leaves, in opposition to the later ones, are long and narrow, getting narrower on both sides, with an acute apex (tab. 21).

Statio: Praecipue praeter oram in lutoso argillaceo soli, sub eo glarea, praeter litora, aestuaria, salinas, salsos paludes et in silvis maris accessu expositis.— Flor. et fruct.: In India Bat. per totum annum.

Distrib.: India: Sindh (MURRAY); Bombay (MURRAY, COOKE); Malabar (RHEEDE; WIGHT); Ceylon (THWAITES, CLARKE, COOKE); Madras (WATT); Coromandel (ROXB.); Gangesdelta (MURRAY); Sunderbuns (WALL.); Burma (HAMILT.; KURZ; MURRAY); Chittagong--Tenasserim (KURZ); Martaban (WALL.); Malacca (WIGHT.; GRIFF.); Penang, Singapore (WALL.; KING/GAMBLE);--Insulinde: Sumatra, Banka, Java, Borneo; Celebes, N.-Guinea;--Philippines;--China: Fokien, ins. Kulangsu; Amoy; Formosa; Takow; Kwangtung near Syngmoon; Hongkong (Forbes/Hemsley).-

Vern.: *Api-api* (Java; Borneo: etc.); *Api-api-katjang* (Tjilatjap, Java--KOORD.); *Bina* or *Byna* (Hind., Beng.--ROXB.; MURRAY); *Bogem* (Poeger, Besoeki, Java--KOORD.); *Caju cantekka* (Java--Burm.); *Calapini* (T. Lamao, Philipp -- MERR.); *Cheria* (Sindh--WATT); *Hapi-hapi*; *Hapi-hapi-Brajoe* (Besoeki, Java-- KOORD.); *Kajoe-api-api* (Java--Zoll., MIQ.); *Kajoe doedoek* (Lampong, Sumatra--GUSDORF); *Kajoe kendeka* (Batavia, Java--KOORD.); *Kajoe ting* (Menado, Celebes-- KOORD.); *Kandalu* (Bram.-- COMMELIN); *Kanna* (Ceylon-- TRIMEN); *Kibalanak* (Djampangkoelon, Java-- KOORD.) *Mada-Chettu*; *Nalla-mada* (Tel.-- WATT.); *Oepalī* (Bram.--COMM.); *Oepata* Malabar--RHEEDE); *Pe-ape* (Madoera, Java--KOORD.); *Pepe Pepe* (Makasar, Celebes--RUMPH.) *Salgueira* (Luzit.--COMMELIN); *Sa-maek ruaek-wum* (Burma—HAMILT); *Timmer* (Sindh--MURRAY); *Tivar* (Mar.--WATT); *Uputti* (Malab.--WATT); *Zoutboom* (Dutch.--COMMELIN).

Coll. Herb. Bog:

Java: Res. Batavia: Maroenda near Tandjong-Priok (BACKER No. 21442-- 27 Oct. 1916; BAKH. No. 450-- 11 Nov. 1917; BAKH. No. 1190-- 2 Mrch. 1919);-- Res. Preanger-Regentschappen: Balekambang, Djampangkoelon (KOORD. No. 9693-- 6 July 1890);-- Res. Cheribon: Sewoe (BACKER No. 16736-- 30 Sept. 1914);-- Res. Soerabaja: Soerabaja (ZOLLINGER No. 2154-- Aug. 1844);-- Res. Pasoeroean: Pasoeroean (VALETON No. 237-- Sept. 1890);-- Res. Besoeki: Gradjagan (KOORD. No. 9702-- 10 June 1889); Pangpang-baai (Becking No. 8-- 25 Sept. 1920); Rogodjampi -- Balak (KOORD. No. 9703-- 6 Sept. 1889); Poeger (KOORD. No. 9700-- 19 Sept 1889; Koord. No. 9697-- 27 Sept. 1889; KOORD. No. 12851; 12852-- 3 June 1892; KOORD. No. 13162-- 7 June 1892; KOORD. No. 9698; No. 12726; No. 12875; No. 12876; No. 12879; No. 12880; No. 12887; No. 12938; No. 12944; No. 12945; No. 12946-- 7 Dec. 1892; KOORD. No. 9699-- 8 Dec. 1892; KOORD. No. 20683; No. 20691; No. 20694; No. 20696; No. 20697; No. 20698; No. 20703-- 11 Oct.1895; KOORD. No. 20623; No 20624; No. 20625; No. 20626; No. 20627; No. 20628; No. 20629; No. 20630; No. 20631; No. 20633; No. 20634; No.20637--16 Oct. 1895; KOORD. No. 30054; No. 30057; No. 30058-- 8 Mrch. 1898; KOORD. No. 39758; No. 39760; No. 39767; No. 39795; No. 39800; No. 39839; No. 39841; No. 39842; No. 39853; No. 39854--10 May 1902; BEUMÉE No. A 61-- Aug. 1918;

Sumatra: Medan, Belawan, (LÖRZING No. 6028— 1 Sept. 1918); Lampongsche Distr. near Oewai Koenjir, Telok Betong (GUSDORF No. 15-- 25 Oct. 1913);

Banka: Muntok (TEYSM.);

Borneo: Singkawang (HALL. f. No. B. 271.-- 3 Oct. 1893);

Celebes: Saleyer (TEYSM No. 13767); Menado (KOORD. No. 19484-- 17 May 1895);

N.-Guinea: Merauke (Versteeg No. 1887-- 6 Nov. 1907);

Philippines: Palawan (FOXWORTHY No. 761-- Mrch./Apr. 1906); Mindoro (MERRIT No. 9796-- Febr./Apr. 1908);

Brit.-India: Amherst, Tenasserim (FALCONER No. 388).

Use: The wood is especially used as fire-wood. In Celebes, near Makassar and Menado, it seems to be used for building houses, however, it is only durable enough for the interior (RUMPH., KOORD.). In sea-water, the saying is, that the wood is indestructable, which makes it suitable for small rowing-boats. Rumphius also mentioned the fact that the Javanese used the trunk for rice-blocks; the black heart of the old trunks was reduced to fine powder in Celebes, and then used as an ointment against headaches. According to RHEEDE Hort. Mal., the ashes, obtained from the wood and the fruit, can be used, as is done in Malabar, for the bleaching of clothes; they are further used by painters for mixing their colours. The bark is supposed to be an astringency, and it is said that in Sindh and Bombay, it is used for tanning purposes. The fruit is eaten everywhere after a preliminary preparation, (generally by cooking or soaking it in water for a long time and then often drying it in the sun to get rid of its bitterness).-- RUMPHIUS mentions these details in his Herb. Amb. under *Mangium album*, speaking however of the large species (*A. officinalis* L.) of Malacca.-- Rheede says that in Malabar the name for the fruit is „carils"; besides, with the seeds cooked with the leaves of *Adamboe--Ipomoea campanulata Linn.* and some butter, they make an ointment which rapidly ripens tumors and pimples.

3. AVICENNIA NITIDA JACQ.

(Tab. 22.)

Nom. et Syn: *Avicennia nitida* JACQ. Select. Stirp. Amer. Hist. (1763) p. 177 et tab. 112. fig. 1 [!]; LINN. Spec. Plant. II (1764) p. 891 [!]; LINN. Gen. Plant. (1764) p. 579 [!]; LAM. Enc. Méth. Bot. I (1783) p. 330 [!]; GMELIN Syst. Nat. II 2 (1796) p. 963 [!]; MURRAY/PERS. Syst. Veg. (1797) p. 616 [!]; WILLD. Spec. Plant. III p I (1797--1830) p. 395 [!]; PERS. Syn. Plant. II (1807) p. 143 [!]; LAM. Rec. Planch. Bot. Enc. III (1823) p. 540 [!]; SPRENG. Syst. Veg. II (1825) p.768 [!]; CHAMISSO in Linnaea VII (1832) p. 370 [!]; DIETR. Syn. Plant III (1843) p. 619 [!]; MIQ. Symb. Flor. Surin. in Linnaea XVIII [1844] p. 264 [!]; WALP. Rep. Bot. Syst. IV (1884--1848) p.133 [!]; SCHAU. in DE CAND. Prod. Syst. Nat. XI (1847) p. 699 [!]; SCHAU. in MART. Flor. Bras. IX [1851] p 303 [!]; GRISEBACH Flor. Brit. W. Ind. Isl. [1864] p. 502 [!]; THOMS/MURRAY Voy. Chall. Bot. I [1885] p. 57 [!]; ASA GRAY Syn. Flor. N. Amer. Ed. 2 vol. II. [1888] p. 341 [!]; SCHIMP. Mal. Strandfl. [1891] p. 98. [!];— A. *tomentosa* JACQ. Select. Stirp. Amer. Hist. [1763] p. 178, et tab. 112 fig 2 [!]; LINN. Gen. Plant, [1764] p. 579 [!]; LAM. Enc. Méth. Bot. I [1783] p 330 [!]; SWARTZ Observ. Bot. [1791] p. 248 [!]; GMELIN Syst. Nat. II 2 [1796] p. 963 [!]; MURRAY/PERS. Syst. Veg. [1797] p. 616 [!]; MIQ. Symb. Flor. Sur. in Linnaea 18 [1844] p. 264 [!];-- A. *germinans* LINN. Spec. Plant. II [1764] p. 891 [!];— *Avicennia* spec. REICH. Gen. Plant. [1778] p. 328 [!];--A. *africana* PALIS BEAUV. Flor. d'Oware et Benin. I [1804] p. 80 t. 47; SCHAU. in DE CAND. Syst. Nat. (1847) p. 699 [!]; SCHAU. in MART. Flor. Bras. IX [1851] p. 305 [!];— *A. elliptica* THUNB. Plant. Bras. Dec. III [1817] p. 37 No. 39, ex WALP. et SCHAU.;— *A. tomentosa* MEYER Prim. Esseq.

[1818] p. 221;--- *A. tomentosa* L. var. *cumanensis*; var. *campechiensis* et var. *guyaquilensis* H. B. KTH. Syn. Plant. Nov. Gen. II [1823] p. 283 et 284; WALP. Rep. Bot. Syst. IV [1844--1848] p. 132 et 133 [!];-- *A. floridana* RAFIN. Atl. Journ. 148 ex Ind. Kew.-- *A. Meyeri* MIQ. Symb. Flor. Surin. in Linnaea 18 [1844] p. 263 [!];-- *A. Lamarkiana* PRESL. Bot. Bemerk. [1844] p. 99;-- A. *tomentosa* L. var. *owarensis* WALP. Rep. Bot. Syst. IV [1844--1848] p. 133 [!];-- *A. oblongifolia* NUTT. ex CHAMP. Flor. South. Unit. States [1860 et 1865] p. 310;-- *A. officinalis* L. var. *nitida* [JACQ.] O. Ktze. Rev. Gen. Plant. II [1891] p. 502 [!];-- *Bontia germinans* L. Spec. Plant. II [1763] p. 891 [!]; BURM. Flor. Ind. [1768] p. 138 [!];-- *Bontia* spec. BROWN. Hist. Nat. Jam. [1756] p. 263; LINN. Spec. Plant. II [1763] p. 891 sub. *Bontia germinans* L. [!]; JACQ. Stirp. Amer. [1763] p. 178 sub *A. tomentosa* JACQ. [!]; LINN. Spec. Plant. II [1764] p. 891 sub A. *germinans* L. [!];-- *Bontia foliis subtus tomentosis* JACQ. Enum. Plant. Amer. [1760] p. 25; LINN. Spec. Plant. II [1763] p. 891 sub *B. germinans* L. [!];--*Bontia foliis oppositis, pedunculis spicatis* LINN. Syst. [1760] p. 1122 ex JACQ.;-- *Mangle laurocerasifolius*, flore albo tetrapetalo SLAON Hist. Jam. II [1707] p. 66; LINN. Spec. Plant. II [1763] p. 891 sub *B. germinans* L. [!]; JACQ. Stirp. Amer. [1763] p. 178 sub A. *tomentosa* JACQ. [!]; LINN. Spec. Plant. II [1764] p. 891 sub A. *germinans* L. [!];-- *Donatia* LOEFL. Iter. Hist. [1758] p. 193 ex JACQ.;-- *Hilairanthus nitidus* [JACQ.] VAN TIEGH et *Hilairanthus tomentosus* [JACQ]. VAN TIEGH. in Journ. de Bot. XII [1898] p. 358 [!].

Arbor ramosa, 4--15 M. alta, 0.5--0.8 M. diam. Ramuli patentes, nutantes, teretes, laeves, novelli dense tomentosi glabrescentes, sparse resinoso-punctati, sparse lenticellati. Folia lanceolata vel oblonga, basi acuta, in petiolo attenuata, raro obtusa vel rotundata, apice acuta vel obtusa, margine vix recurvula, supra glabra, nitida, minutissime glandulosa, viridia, subtus dense adpresse persistente pulverulenta, in sicco fulva vel glaucescentia, opaca (vel ex JACQ. nitida), abscondite resinoso-punctata, costa subtus pulverulenta glabrescentia, elevata, nervis 10--15; obsolete reticulato--venosis, 6--12 c.M. longa, 1.5--4 c.M. lata; petiolus brevis pulverulentus vel glabrescens, 0.5--1.5 c.M. longus. Inflorescentia terminalis, paniculiformis, subfoliosa, 3--10 c.M. alta; cymae, terminales et ex axillis foliorum supremorum, solitariae pedunculatae; spicae densae plus minusve elongatae vel subcephaloideae, saepe dissiti-florae 0.5-2 c.M. longae, 0.5--1 c.M. diam., e floribus 2-14 decussatis composita formantes, pedunculis quadrangularibus, sicco sulcatis dense adpresse furfuraceis cinerascentibus dense abscondite resinoso-punctatis, et sparse obsolete glandulosis, bracteis parvis sessilibus ovatis obtusis, extus densissime pulverulento-tomentosis, mox scariosis deciduis, bracteolis 2, oblongis obtusis extus omnino furfuraceo-tomentellis, costa prominente, intus glabris, 0.3-0.5 c.M. longis, 0.2-0.3 c.M. latis. Flores sessiles, parvi, 0.3-0.5 c.M. longi, 0.25-0.5 c.M. diam. Calyx parvus, laciniis subinaequalibus, subovatis, ciliatis, extus omnino densissime adpresse pulverulento-tomentosis, opacis, intus glabris, lucescentibus, utrimque sparse resinoso-punctatis, 0.3-0.5 c.M. longis, 0.2-0.3 c.M. latis. Corolla

parva, albida, crassiuscula, post anthesin delapsa, regularis, bis medio incisa, tubo campanulato, calycem aequali vel breviore, extus fere glabro, 0.12-0.2 c.M. alto; laciniis subconformibus aut labii superioris sub duplo latiore, obtusiusculo-oblongis vel subquadratis, radialibus, patentibus, extus densissime lucescente villosis, intus velutino-tomentosis, 0.2-0.25 c.M. longis, 0.15-0.2 c.M. latis. Stamina vix exserta corollae laciniis breviora, 0.15-0.2 c.M. longa, filamento brevi, anthera minima, subrotunda, 0.07-0.12 c.M. diam. Ovarium conicum, omnino dense longo-sericeum, dense resinoso-punctatum; imperfecte biloculare, dissepimento spurio medio non alato, ovulis utrimque binis, stylo filiforme elongato, fere omnino dense brevi albido-villoso, resinoso-punctata, corollae tubo exserta, staminis aequante, post anthesin excrescente, calyce longe exserto, 0.3-0.4 c,M. longo, stigmate manifesto, aequali-bifido accrescente cito recurvo. Fructus rhomboideus, subcompressus, ante delapsum excrescens. Radicula fere omnino villosa, intra pericarpium germinans.

Remarks: Description after incomplete material in the Herb. Bog., which originally came from Porto Rico and St. Croix, adding to it particular quotations from the most important literature on the subject.- The habits of *A. nitida* JACQ. are very similar to those of *A. marina* var. *alba*, especially with regard to the shape of the leaves. The flowers are as small as in *A. marina*; for the rest, they are the link between the two asiatic species. According to SCHIMPER, the fruit is supposed to germinate on the tree, but keeps its pericarp for a long time. The 2d. fig. of tab. 112 represented under *A. tomentosa* JACQ. in the Stirp. Amer. shows a leaf very similar to those of A. *officinalis* L., but with a cordate base; this does not occur with the A*vicennias*; JACQUIN himself does not mention it in his description. JACQUIN describes the leaves of A. *nitida* JACQ. as „folia nitida", and those of A *tomentosa* JACQ. as „foliis subtus tomentosis". These peculiarities should be considered as nothing more than specific differences. The two kinds described by JACQUIN cannot be considered in my opinion anything else but two formes for the same species, all the more as JACQ. apparently did not find any difference in the flowers.

Statio: Praeter litora, aestuaria et salsos paludes.-- Flor. et fruct.: Jan.-- Dec. (?).

Distrib: Trop. America: Bermuda-Ins.; Florida; Mexico; (THOMS/MURRAY); Venezuela (SCHIMP.); Caraib. Isl. (JACQ.); Cuba (SCHAU.; GRISEB.); Jamaica (GRISEB.); St. Martin (BOLDING); Antigua (GRISEB.); Guyaquil; St. Thomae [WALP.]; Guadeloupe [SCHAU.]; Martinique [JACQ.; SCHAU.]; St. Lucia; St. Vincent (GRISEB.); St. Croix (BOLD.); Antillen; Suriname (MIQ.; PULLE) Curacao near Frt. Amsterdam (BOLD.); Guiana (SCHAU.); Trinidad (GRISEB.); Brasilia (CHAM.; SCHAU.; GRISEB.; THOMS./MURRAY.)-- Africa: Guinea [Pobéguin]; Senegambia (SCHAU.); Niger; Grand Bassa; Cape Palmas (HOOK.); Congo, Bananâ (DUP.); Senegal; Sierra Leone-Benin (HOOK); Chama; Koto; Apam; Owar (WALP.).

Vern.: *Black Mangrove* (Bermudas--THOMS./MURR.); *Karnaboom* (Suriname--SCHAU.); *Mangle Blanco* (Mexico--SCHIEDE); *Mangue amarello, Mangue branco* (Brazilia--MART.; SCHAU.); *Ouofri* or *Oufiri* (Guinea, Africa--Pobég.); *Paletuvier gris* (Martinique--JACQ.); *Paletuvier rouge* (Antillen--SCHAU.; Guinea, Africa--Pobéguin); *Palo de sal* (Amer. trop.--PITTIER); *Parwa* [Suriname--PULLE]; *Salpond tree* (St. Martin--BOLD.).

Coll. Herb. Bog.:

Porto Rico (HELLER No. 373—1899); Ins. St. Croix (Herb. Hort. Bot. Haun.-- *Avicennia tomentosa* L.).

4. AVICENNIA TOMENTOSA SCHAU. (?).

Nom. et Syn: *Avicennia tomentosa* (non JACQ.) SCHAU. in DE CAND. Prod. Syst. Nat. XI (1847) p. 699 [!]; SCHAU. in MART. Flor. Bras. IX (1851) p. 305 [!]; GRISEBACH Flor. West-Ind. Isl. (1864) p. 502 [!]; SCHIMPER Ind. Mal. Strandfl. (1891) p. 98. tab. VI fig. 1. 4—8 (!).

Arbor 7 — 10 M. alta. Ramuli teretes, ad nodos incrassati, aciebus duabus a foliorum basi utrinque decurrentibus leviter notati, mox glabrati Folia obovato-elliptica vel lato-oblonga obtusissima in petiolum attenuata, apice vel rotundata vel obtusa supra demum glabra, subnitida, subtus candicantia aetate interdum glabrescentia, siccando decolorescentia neque vero nigrescentia, 7.5 c.M. longa, 3.5 — 4.5 c.M. lata. Inflorescentia brevispicata basi plerumque interrupta. Bracteolae ovatae, naviculares, acutiusculae, triente quam calyx breviores et cum ejus phyllis ovato-oblongis in toto dorso sericeo-tomentosae. Flores oppositi, 6-8 in spicam collecti. Calyx 0.5 c.M. longus. Corolla alba, laciniis patentissimis subquadrato-linearibus, truncatis, postica patente breviore latiore retusa, anticis 3 patentissimis aut reflexis; intus glabris; 0.35 — 0.37 c.M. longis, 0.25 c.M. latis. Stamina filamentis brevibus ad fauces insertis. Ovarium inclusum, conoideum, sericeum, stigmatibus subsessilibus brevissimis exsertis. Fructus ante delapsum excrescens, radicula fere omnino villosa; plumula conspicua.

Remarks: This species is quite unknown to me, and there is very little to be found in the literature about it. SCHAUER and SCHIMPER only place this species in sharp opposition to *A. nitida* JACQ., and it is from their notes that the above description has been compiled, in order to be complete The species seems to me very doubtful, and were it not that SCHAUER spoke of tropical American plants with white flowers and that SCHIMPER followed this example, one would be inclined to think of an omission as a consequence of the great confusion which has always prevailed with the *Avicennias*. SCHAUER'S description with the exception of the white flowers and almost sessile stigmas agrees exactly with that of *A. officinalis* L. A nearer examination on the spot will however help to show whether the American *Avicennias* are really only represented by *A. nitida* JACQ., or whether there exists also a second species, viz. *A. tomentosa* SCHAU.

Statio: Ad litora maris.— Flor. et fruct.: Oct., Febr., etc.

Distrib.: Trop. America: (SCHAU.; SCHIMPER): Brasilia; Mexico; ins. Caribaea; Guadeloupe; Florida.

Vern.: MANGUE SIRIBA (Brasilia — POHL.).

Explication of Plates.

Tab. 14.

Avicennia marina (Forsk.) Vierh. var. alba (Bl.) Bakh.—Fig. a. Young inflorescence and leaf ($\times \frac{2}{3}$);— Fig. b. Older inflorescence ($\times \frac{2}{3}$);— Fig. c. Flowering branch at the end ($\times \frac{2}{3}$);—Fig. d. Flowering portion of inflorescence (× 2);— Fig. e. Expanded flower from above (× 2);— Fig. f. Flower from side (× 10/3); – Fig. g. Old flower, with curved stigmata, corolla fallen (× 2);— Fig. h. Dorsal and ventral surface of bracteole (× 20/3);— Fig i. Idem of bracteolule (× 16/3);— Fig j. Idem of calyx (× 16/3);— Fig. k. Corolla opened, dorsal view (× 8/3);-- Fig. l. Corolla opened, shewing stamens, ventral view (× 8/3);-- Fig m. Front- and back-view of anther (× 20/3);-- Fig. n. Pistil from side (× 20/3);-- Fig. o. Branchlet with young fruit (× 2/3);-- Fig. p. Single fruit (× 2/3);-- Fig. q. Branch with ripe fruit, showing integument bursting before lapse (× 2/3);-- Fig. r. Ripe fruit with bursting integument (× 2/3);-- Fig s. Young seedling, showing the position of the hooked hairs on the hypocotyl (× 2/3).

Tab. 15.

Avicennia marina (Forsk.) Vierh. var. alba (Bl.) Bakh.--Fig. a. Bunch of germinating seeds (× 2/3);-- Fig. b. Idem, Young seedlings with their roots strongly entangled (× 2/3); --Fig. c. Young seedling with the first leaflets (× 2/3);-- Fig. d. Idem, an older one, showing the shape of the first leaves (× 2/3).

Tab. 16.

Avicennia marina (Forsk.) Vierh. var. resinifera (Forst.) Bakh.-- Fig. a. Partion of flowering branch (× 2/3);-- Fig. b. Flowering branchlet, showing very narrow leaves (× 2/3);-- Fig. c. Small inflorescence and leaf, showing the curved bracteal leaves (× 2/3);-- Fig d. Inflorescence with normal leaves at base (× 2/3);-- Fig. e. Lower part of leaf from dorsal (× 4/3);-- Fig. f. Portion of young inflorescence with normal leaves at base, and curved bracteal leaves higher on (× 2/3);-- Fig. g. Inflorescence after lapse of corolla. (× 2/3);-- Fig. h. Inflorescence with leaf and flowers after lapse of corolla (× 2/3);-- Fig. i. Old flowers with very young fruit (× 2);-- Fig. j. Leaf (× 2/3).

Tab. 17.

Avicennia marina (Forsk.) Vierh. var. intermedia (Griff.) Bakh.-- Fig. a. Sprig, showing inflorescence and leaves (× 2/3);— Fig. b. Portion of inflorescence, with capitular-crowded flowers (× 2/3);— Fig. c. Fruiting branch with young fruits and less developed curved leaves (× 2/3);—Fig. d. Idem, with part of the leaves removed (× 2/3);—Fig. e. Stalk with cluster of very young fruit (× 2/3);— Fig. f. Longitudinal section of flower (× 10/3);— Fig. g. Dorsal and ventral view of bracteole (× 10/3);— Fig. h. Idem of bracteolule (× 10/3);— Fig. i. Idem of calyx (× 10/3);— Fig. j. Expanded corolla from side (× 10/3);— Fig. k. Pistils in different stadia (× 10/3);-- Fig. l. Single pistil (× 20/3);-- Fig. m. Front- and back-view of anther. (enlarged).

Tab. 18.

Avicennia marina (Forsk.) Vierh. var. intermedia (Griff.) Bakh.—Fig. a.-h. Seedlings at different stadia of development (× 2/3);-- Fig. i. Breathing-root (× 5/7).

Tab. 19.

Avicennia marina (Forsk.) Vierh. var. Rumphiana (Hall. f.) Bakh.--Fig. a. Sprig, showing inflorescence and leaves (× 2/3);-- Fig. b. Portion of inflorescence (× 2/3);-- Fig. c. Fruiting and flowering branchlet (× 2/3);-- Fig. d. Unexpanded flower, from side (× 4);-- Fig. e. Front-view of anther (× 10).

Tab. 20.

Avicennia officinalis L.-- Fig. a. Inflorescence with capitular-crowded flowers (× 2/3);-- Fig. b. Inflorescence much more elongated (× 2/3);-- Fig. c. and d. Various types of leaves (× 2/3);-- Fig. e. Piece of old bark (× 2/3);-- Fig. f. Expanded flower from above (× 2/3);-- Fig. g. Idem (× 4/3);-- Fig. h. Old flower after lapse of corolla (× 2);--Fig. i. Dorsal and ventral view of bracteole (× 10/3);--Fig. j. Idem of bracteolule (× 10/3);-- Fig. k. Idem of calyx (× 10/3);-- Fig. l. Corolla laid open, view from dorsal (× 4/3);-- Fig. m. Idem, but with ventral view (× 4/3);-- Fig. n. Front view of stamen (× 10/3);-- Fig. o. Young pistil in bud (× 10/3);-- Fig. p. Idem in expanded flower (× 10/3);-- Fig. q. Idem, after lapse of corolla (× 10/3);-- Fig. r. Stalk with very young fruit (× 2/3);-- Fig. s. Stalk with young fruit of older stage (× 2/3);-- Fig. t. Full-grown fruit (× 2/3).

Tab. 21.

Avicennia officinalis L.--Fig. a. and b, Germinating seeds (× 2/3);-- Fig. c. and d. Seedlings (× 2/3).

Tab. 22.

Avicennia nitida Jacq.--Fig. a. and b. Branchlets with leaves and flowers (× 2/3);-- Fig. c. Portion of inflorescence with unexpanded flowers (× 10/3);-- Fig. d. Leaf apart (× 2/3);-- Fig. e. Flower-bud (× 14/3);-- Fig, f. Dorsal and ventral view of bracteole (× 20/3);-- Fig. g. Idem of bracteolule (× 20/3);-- Fig. h. Idem of calyx (× 20/3);-- Fig. i. Corolla in bud (× 14/3);-- Fig. j. Back- and front-view of stamen (× 40/3) -- Fig. k. Pistil in old flower (× 20/3).

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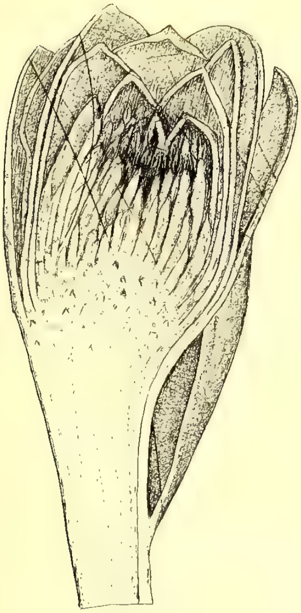
CORRIGENDA.

Page 201, line 43, instead of Schift., read Schrift.
„ 204, „ 31, „ „ MüLLER, „ MUELLER.
„ 206, „ 7, „ „ ticulatis, „ articulatis.
„ 209, „ 39, „ „ 17, „ 7.
„ 211, „ 19, „ „ *Egate*, „ *Egaie.*
„ 211, „ 21, „ „ *Maraban*, „ *Mabaran.*



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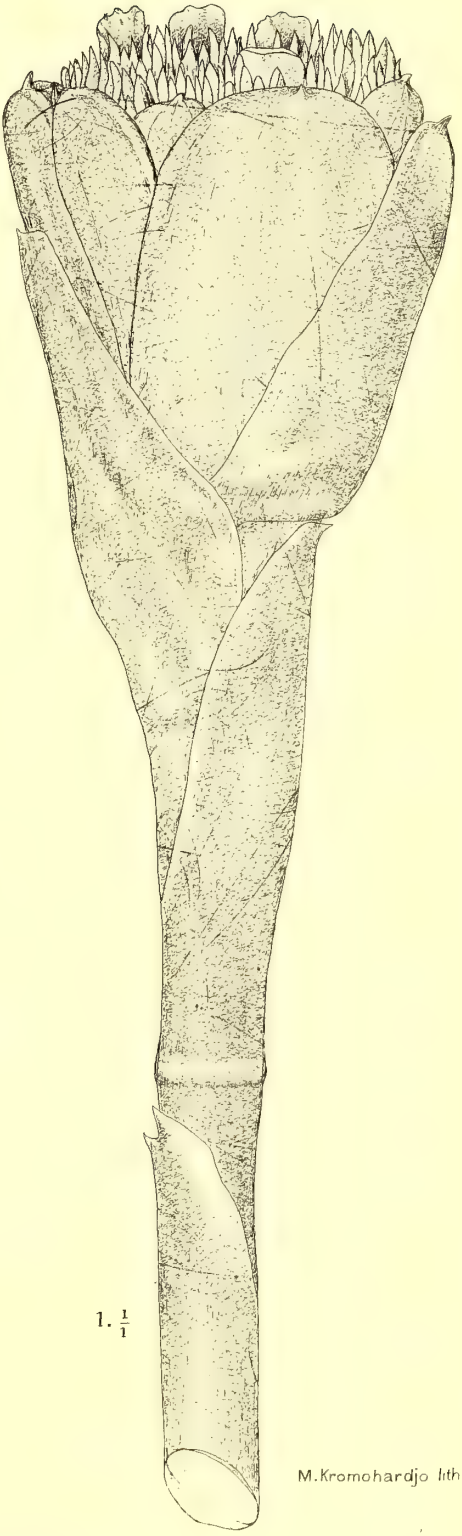

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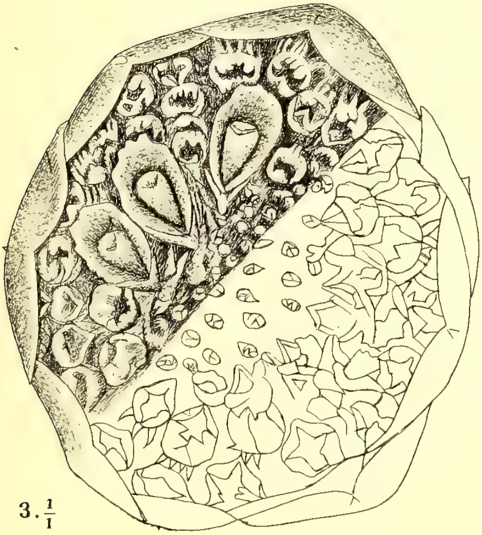

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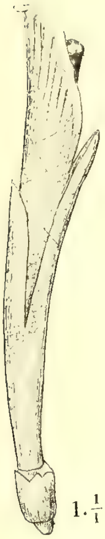
R. Natadipoera del.

M. Kromohardjo lith.

Nicolaia atropurpurea T. et B.



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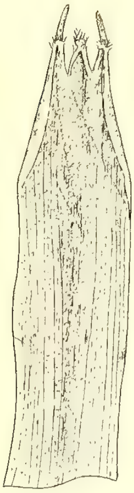

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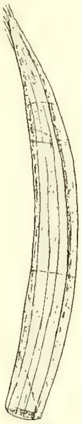

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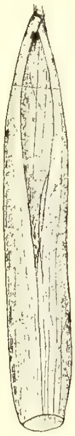

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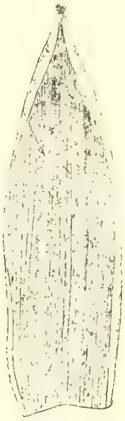

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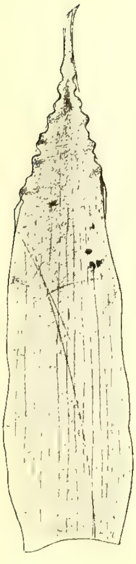

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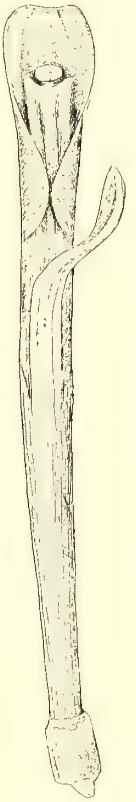

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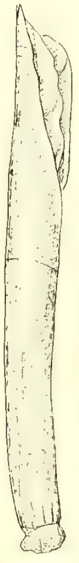

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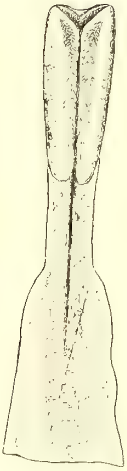
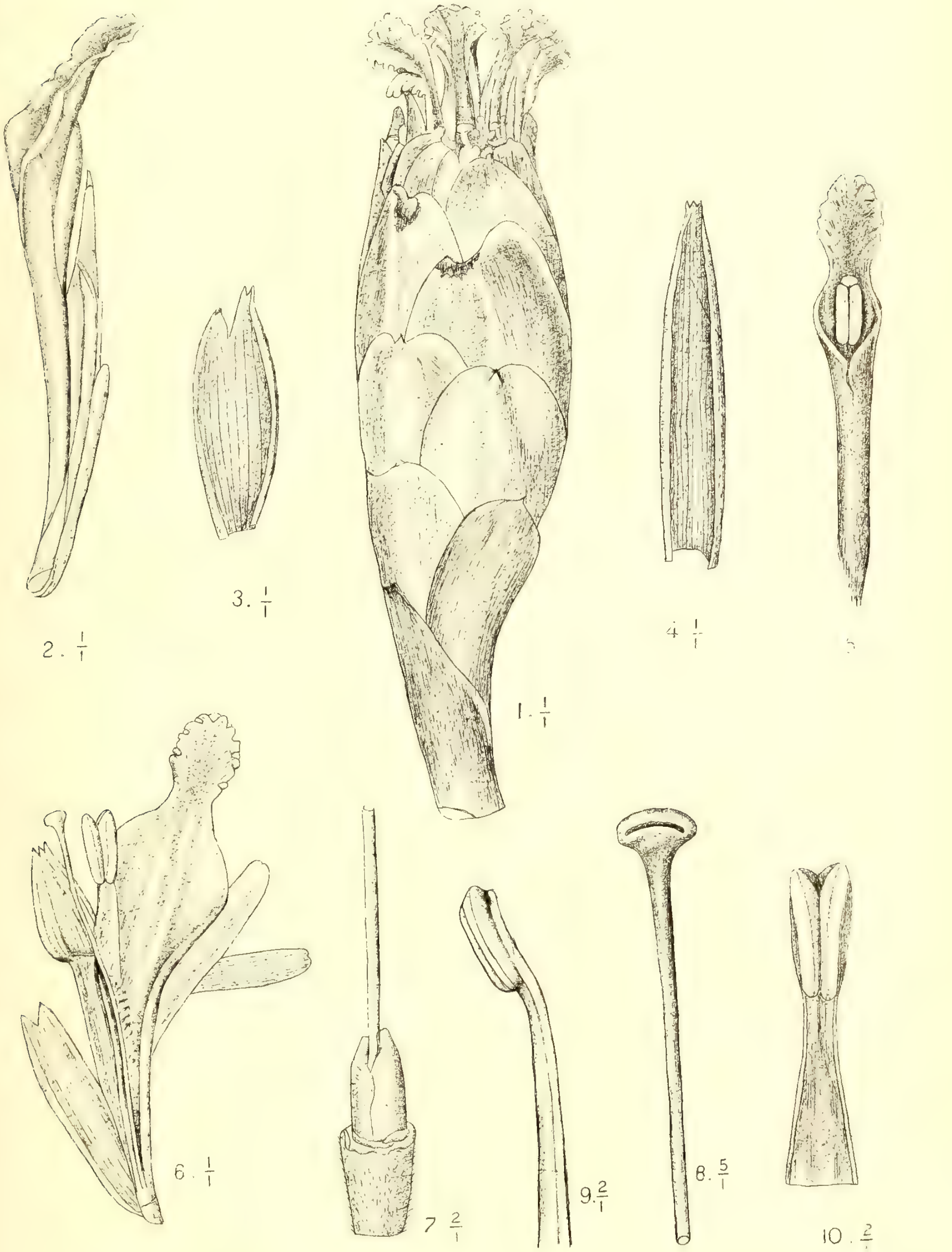


9

K. Natadipoera del.

M. Kromohardjo lith.

Nicolaia grandiligula K. Sch.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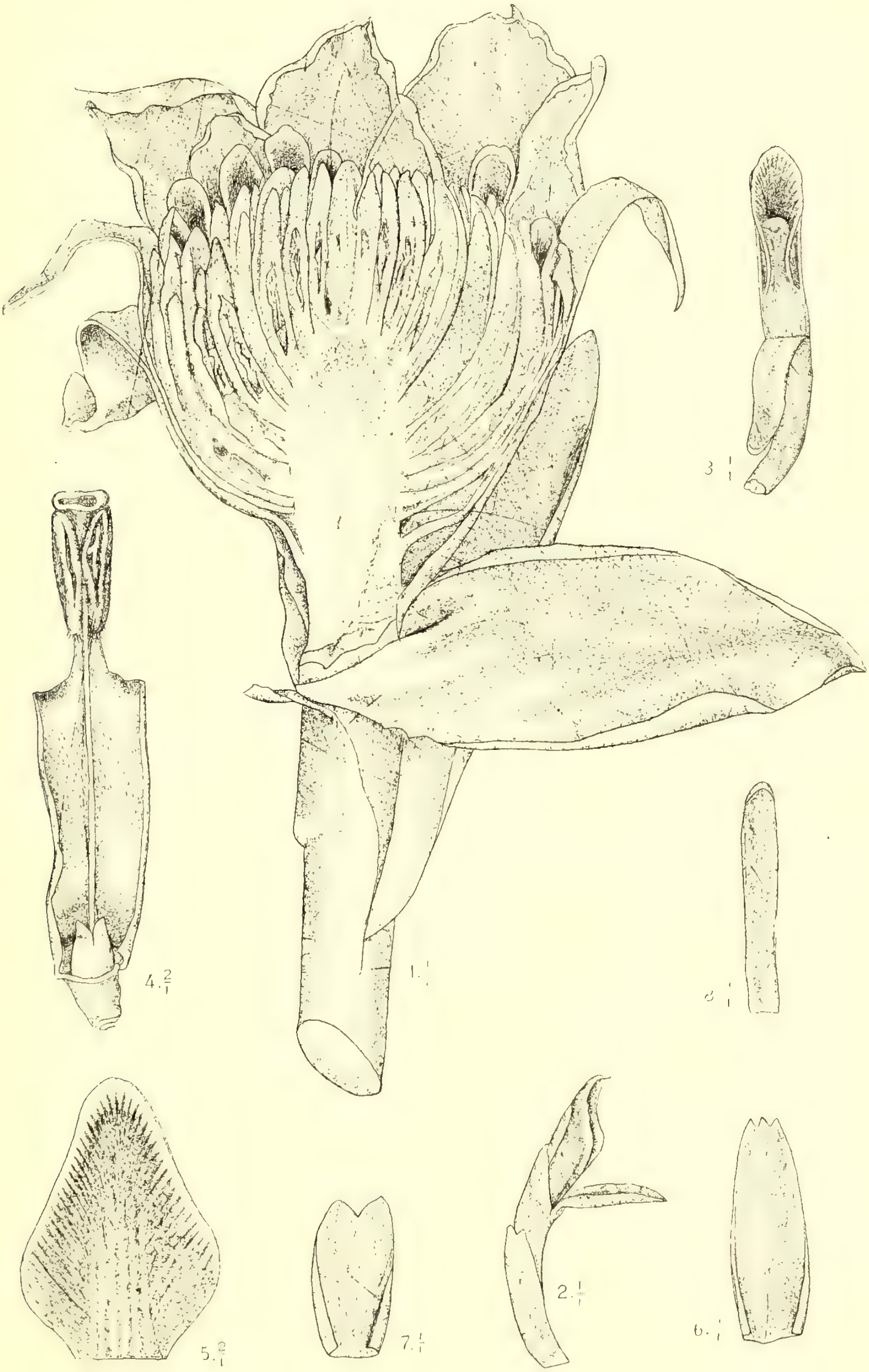
R. Natadipoera del.

M. Kromohardjo lith.

Nicolaia Heyniana Val.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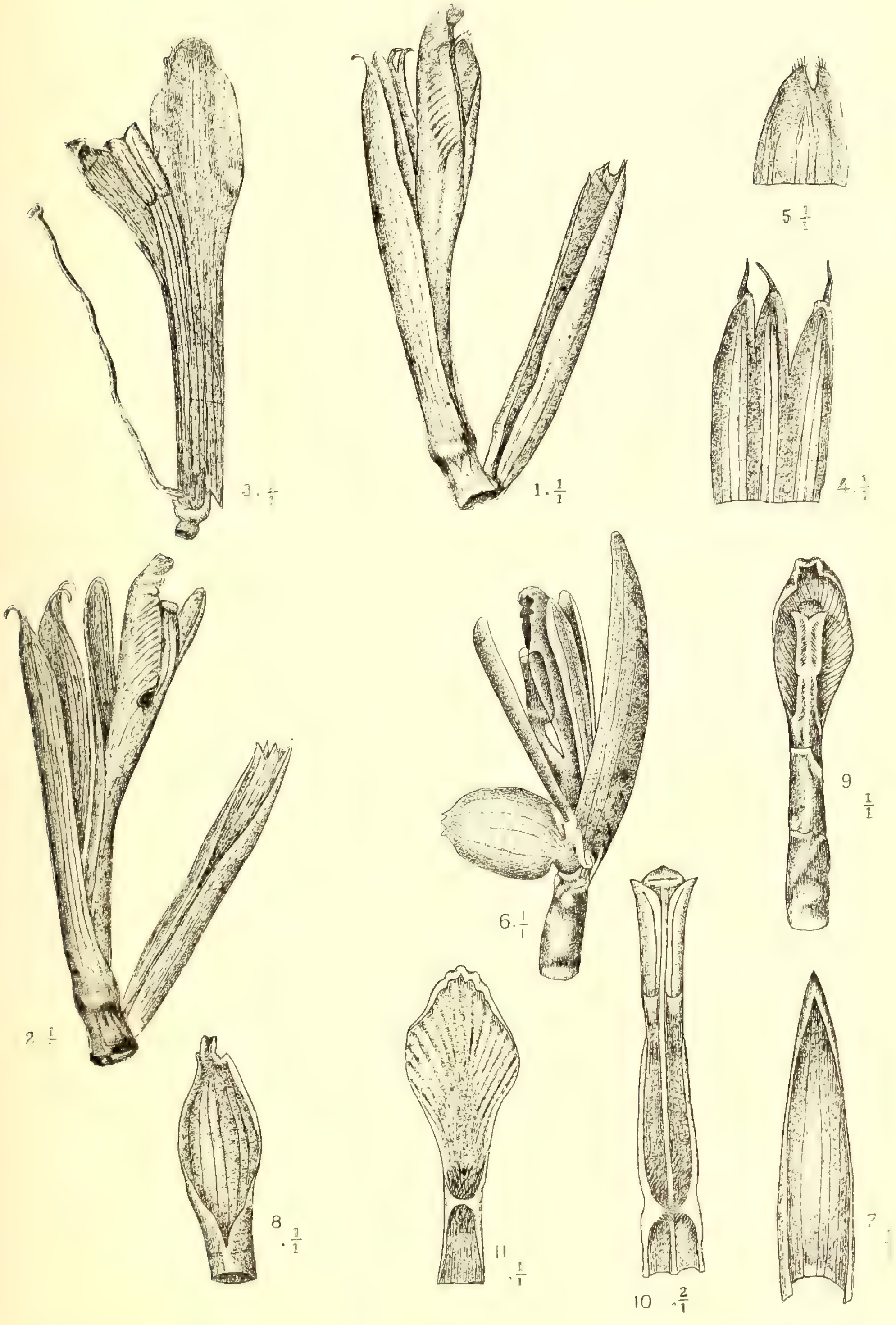
R Natadipoera del.

M.Kromohardjo lith

Nicolaia intermedia Val.

Bull. Jard. Bot. Buitenzorg, Série III, Vol. III. *Tab. 5.*
Th. Valeton, Nicolaia Horan.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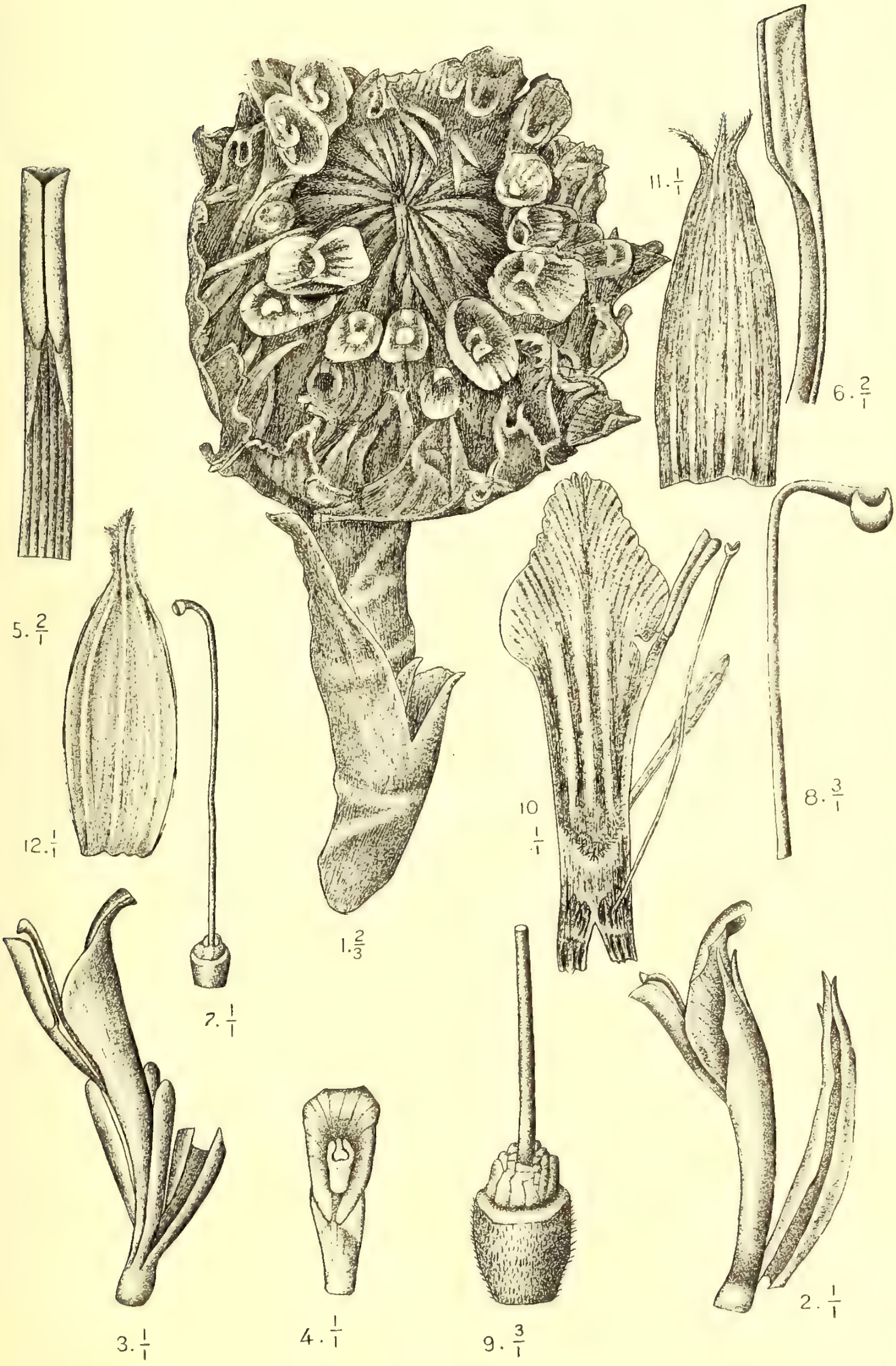
R. Natadipoera del. M. Kromohardjo lith.

1-5 Nicolaia subulicalyx Val.

6-11 " Loerzingii Val.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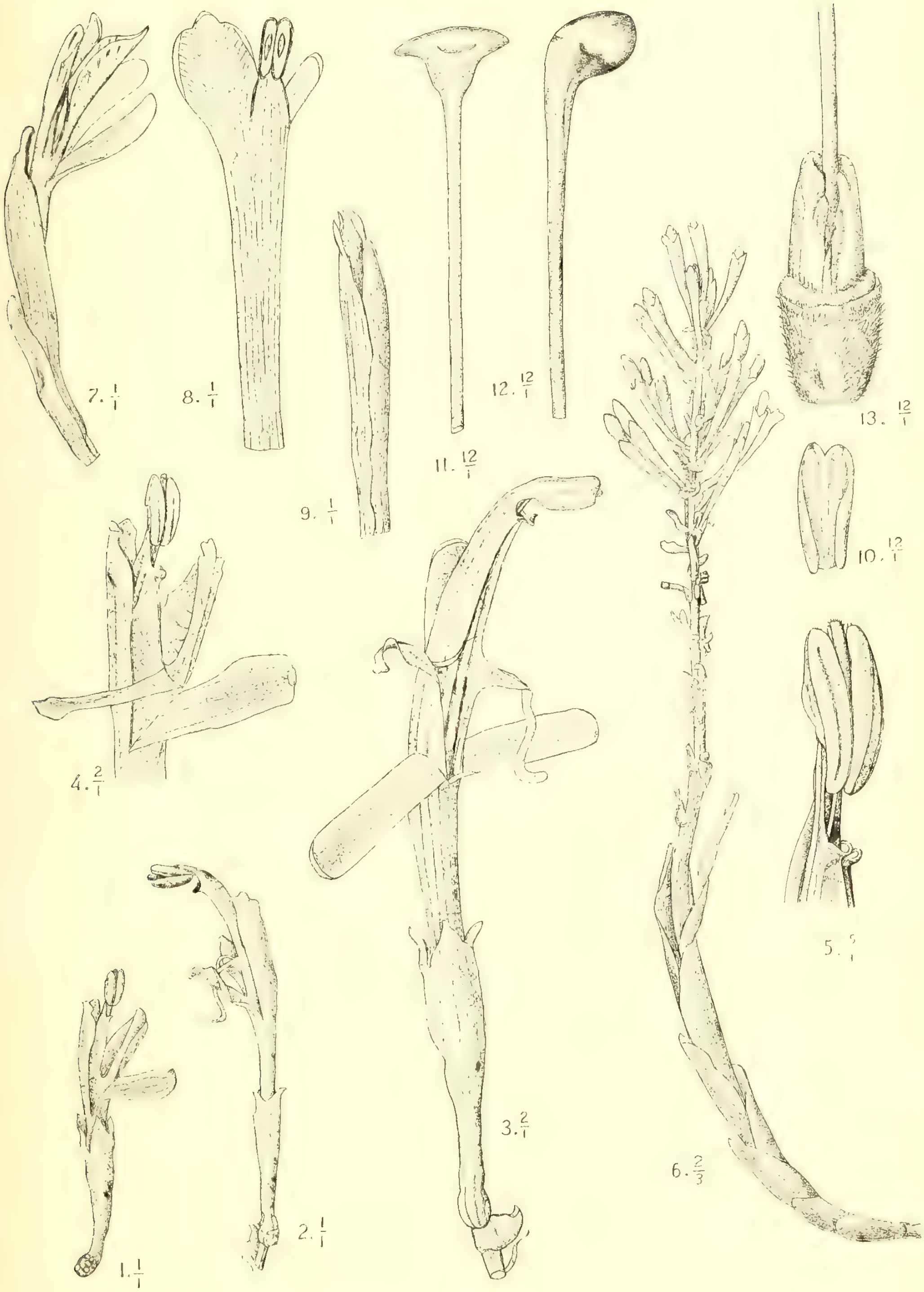
R. Natadipoera del.

M. Kromohardjo lith.

Nicolaia solaris Horan. var. aurantiaca Val.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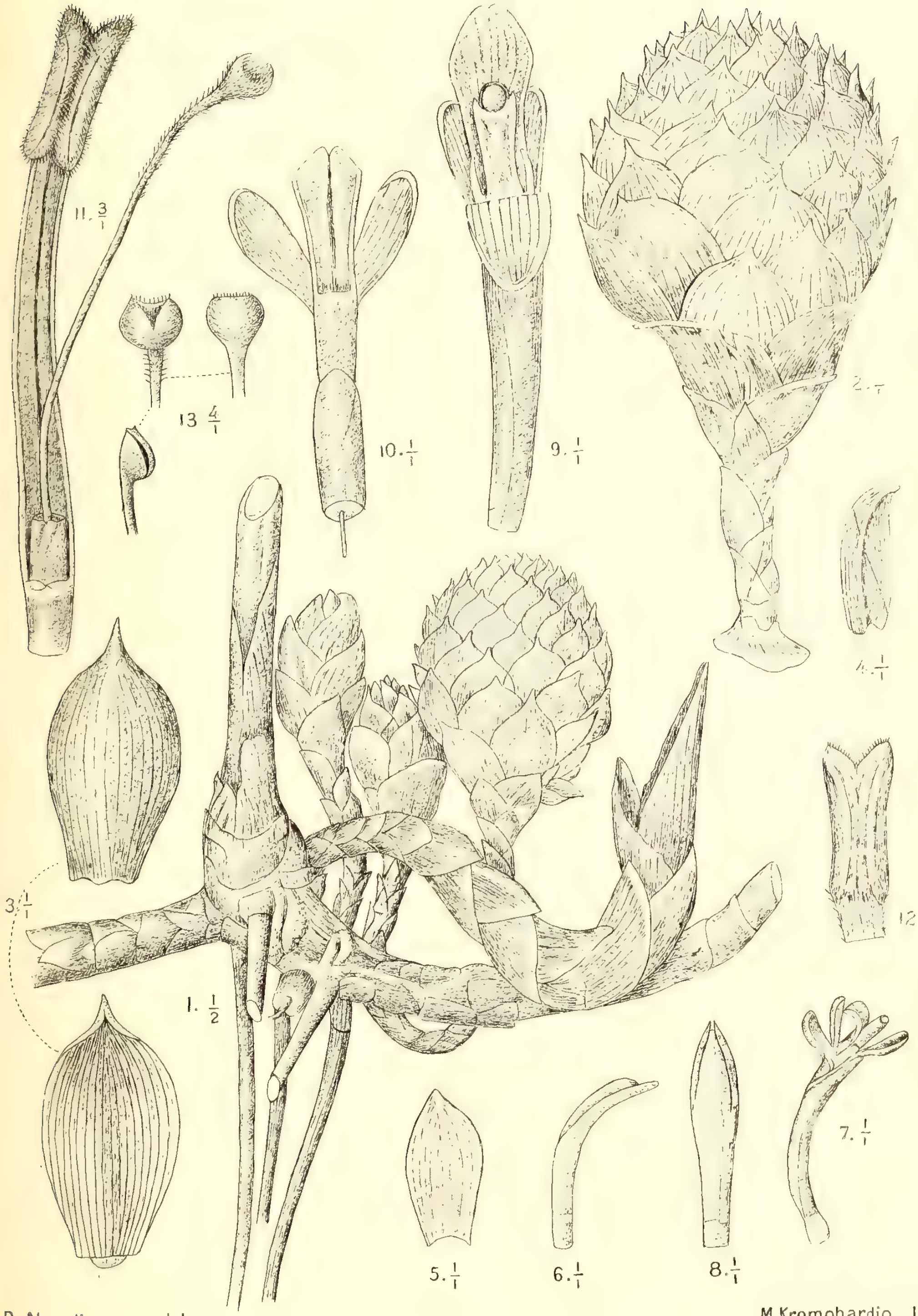
R.Natadipoera del M.Kromchardjo lith

1-6. Rhynchanthus radicalis Val
7-13. Geanthus parvus Val.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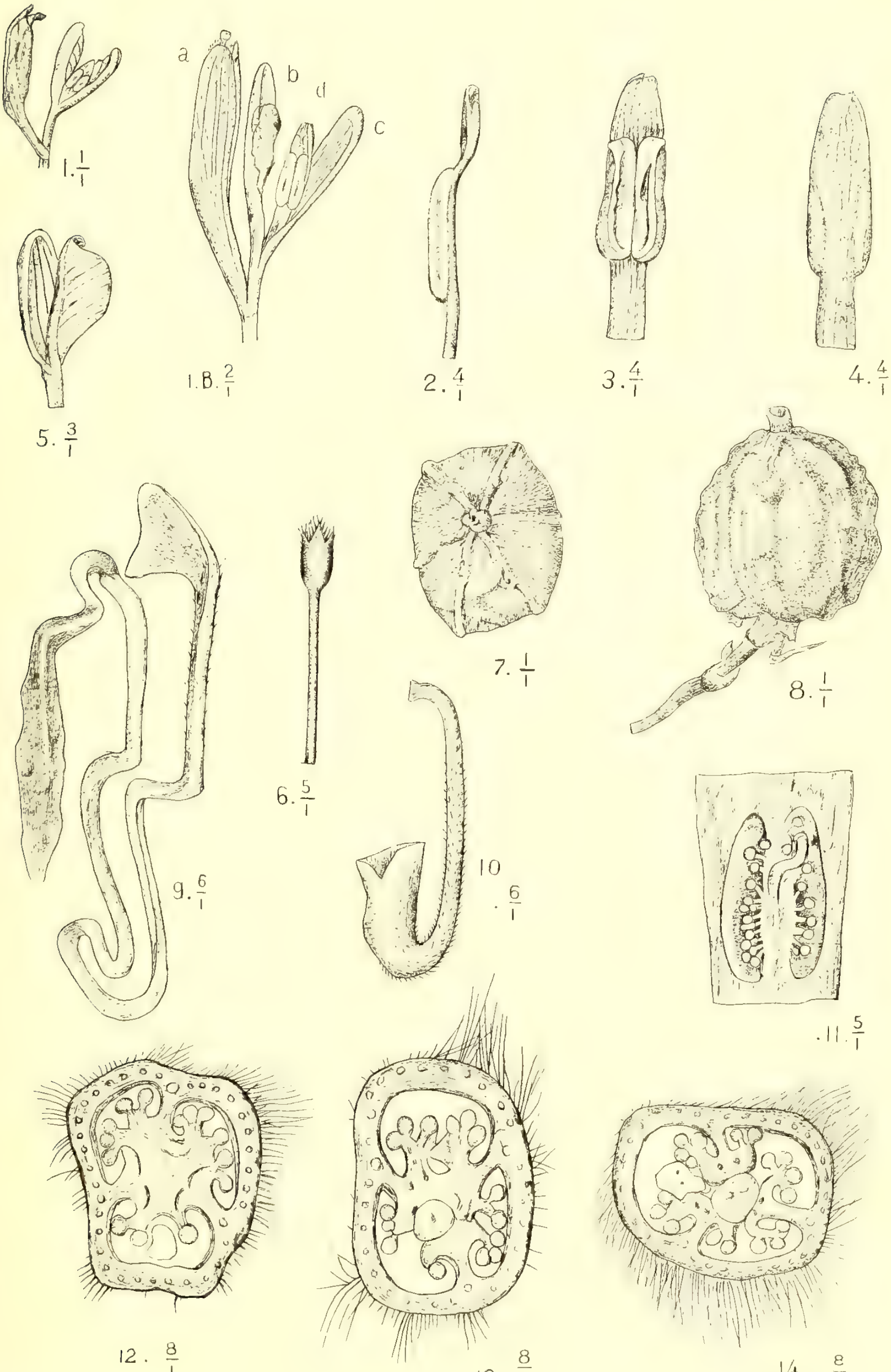
R. Natadipoera del.

M.Kromohardjo lith.

Geanthus echinatus Val.

Bull. Jard. Bot. Buitenzorg, Série III, Vol. III.
Th. Valeton, Elettariopsis, Hornstedtia.

Tab. 9.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.11. 5/1
12. 8/1
13 8/1
14. 8/1

R. Natadipoera del.

M. Kromohardjo lith

1-8 Elettariopsis sumatrana Val.
9-14 Hornstedtia elongata K. Schum.

Bull. Jar
Th. Valet

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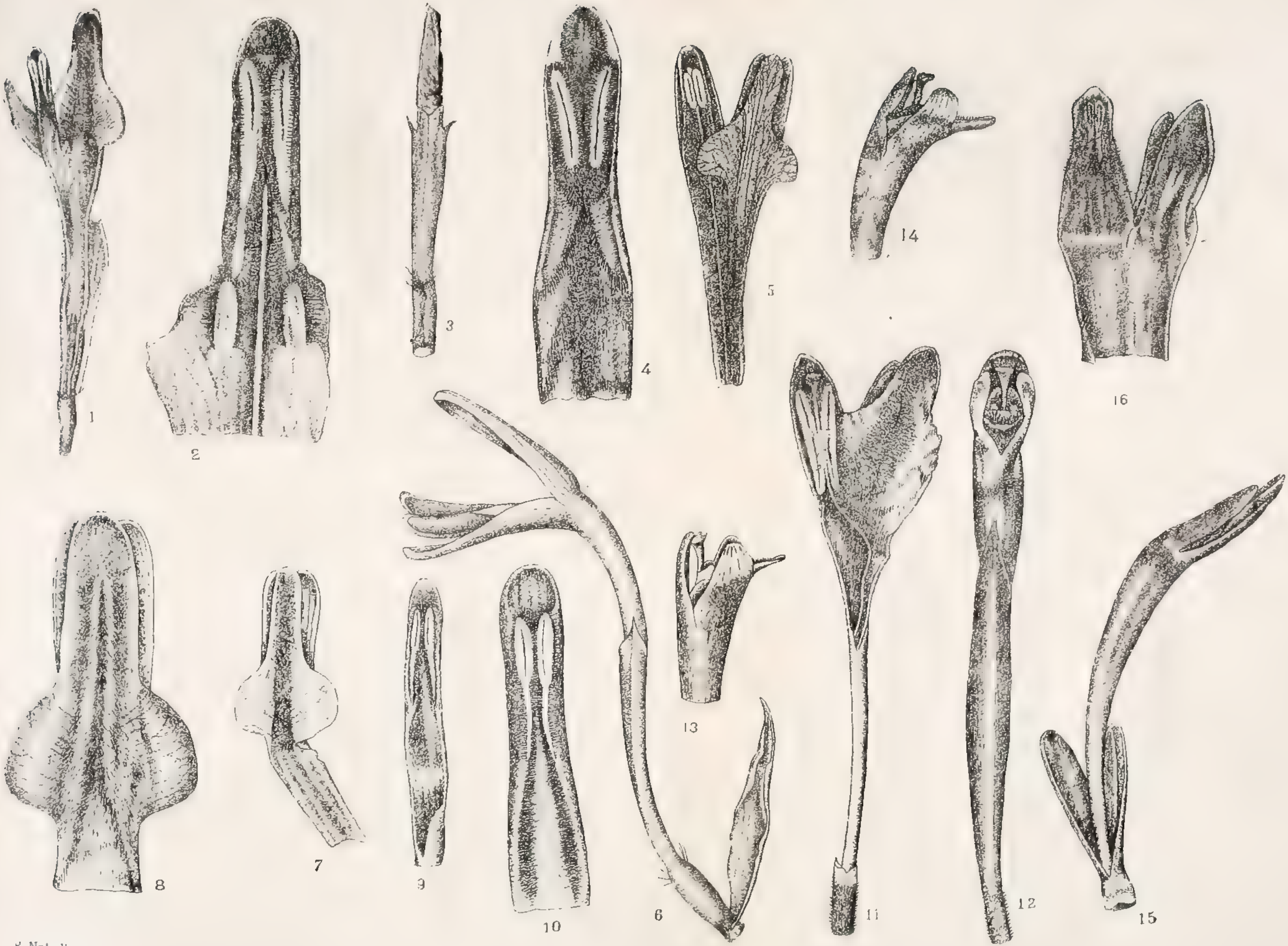
Tab. 10.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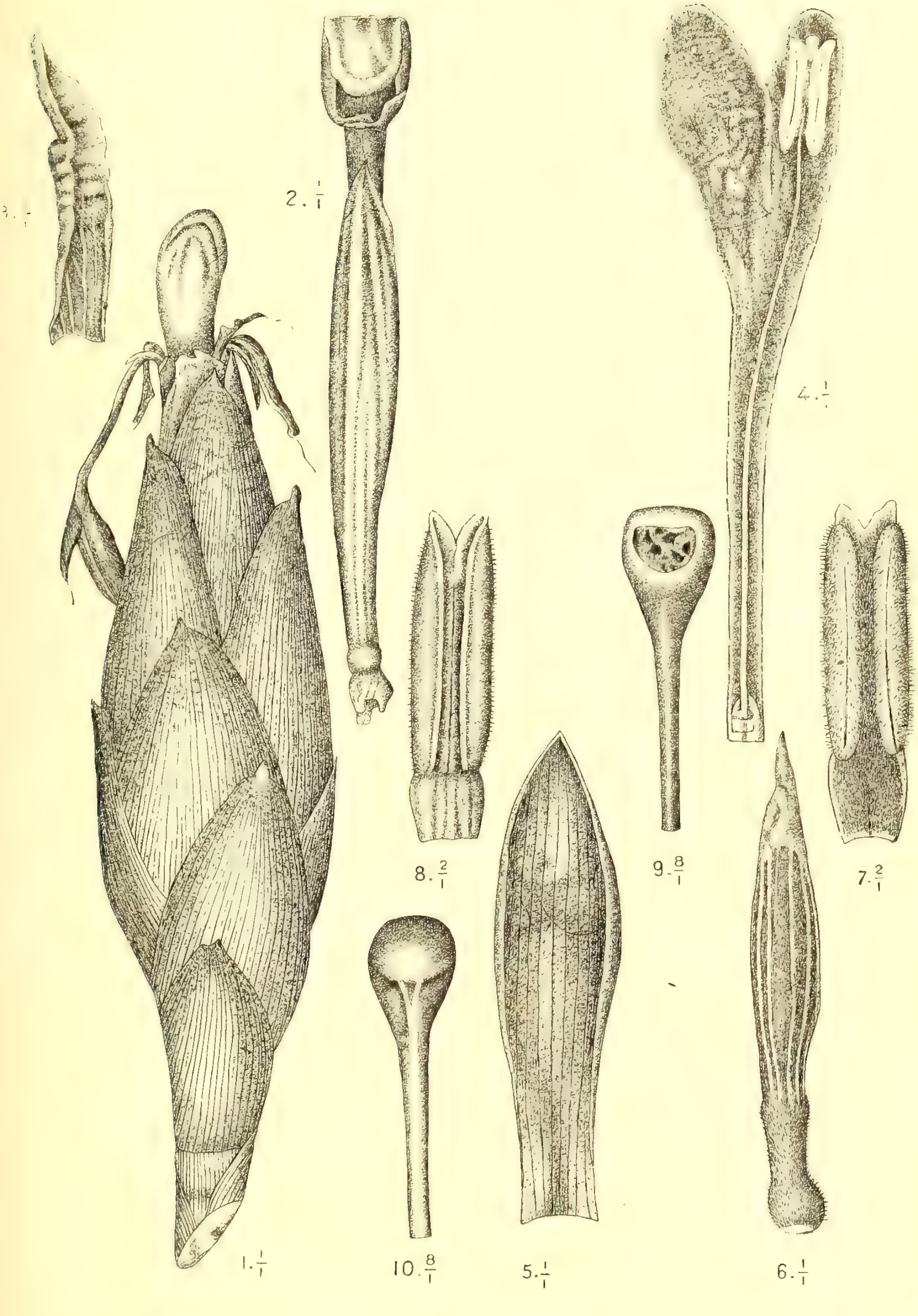
R. Naladipoera del

M. Kromohardjo lith

Hornstedtia

Bull. Jard. Bot. Buitenzorg, Série III, Vol. III.
Th. Valeton, Hornstedtia Retz.

Tab. 11.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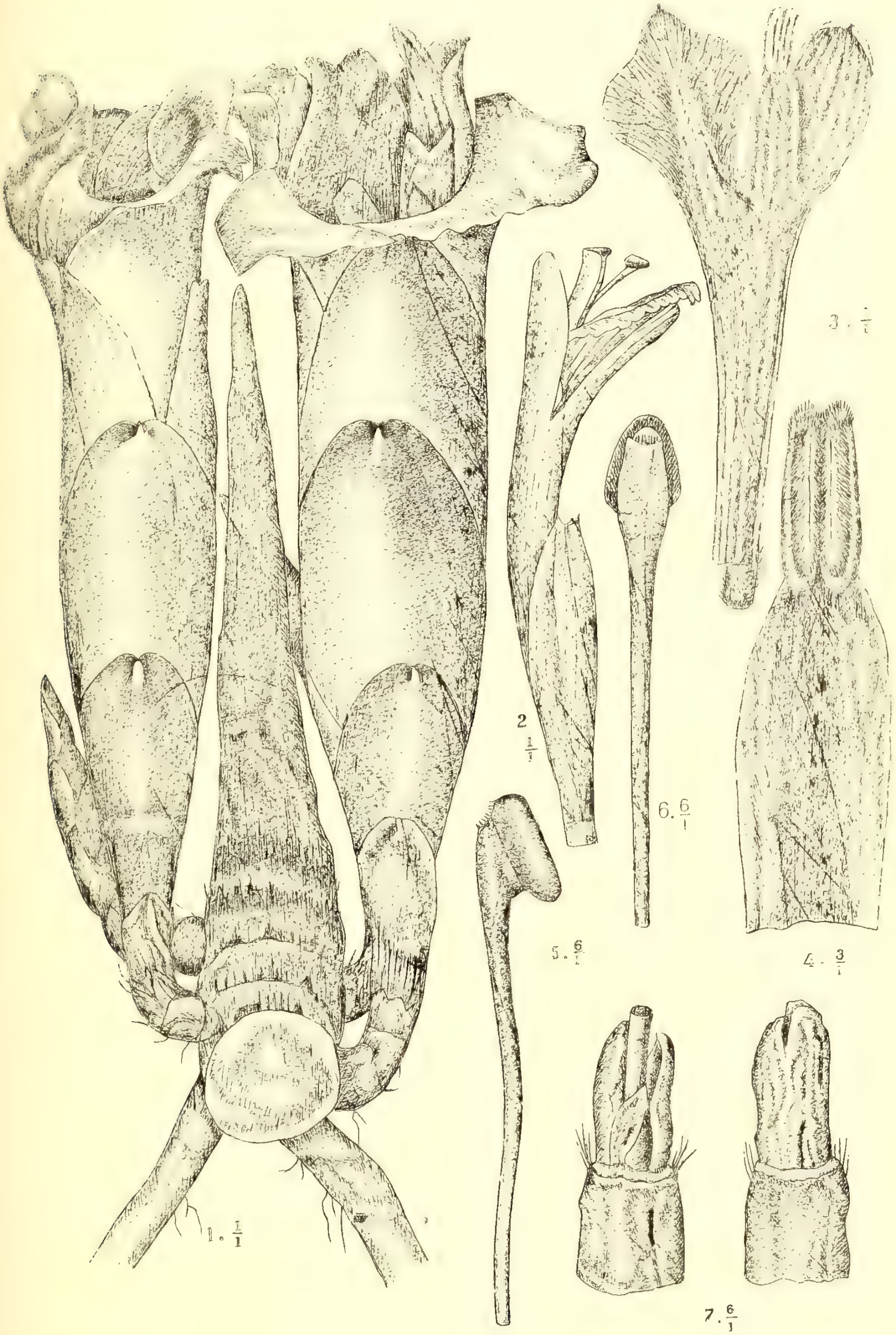
R. Natadipoera del
M. Kromohardjo lith.

Hornstedtia lycostoma K.Sch.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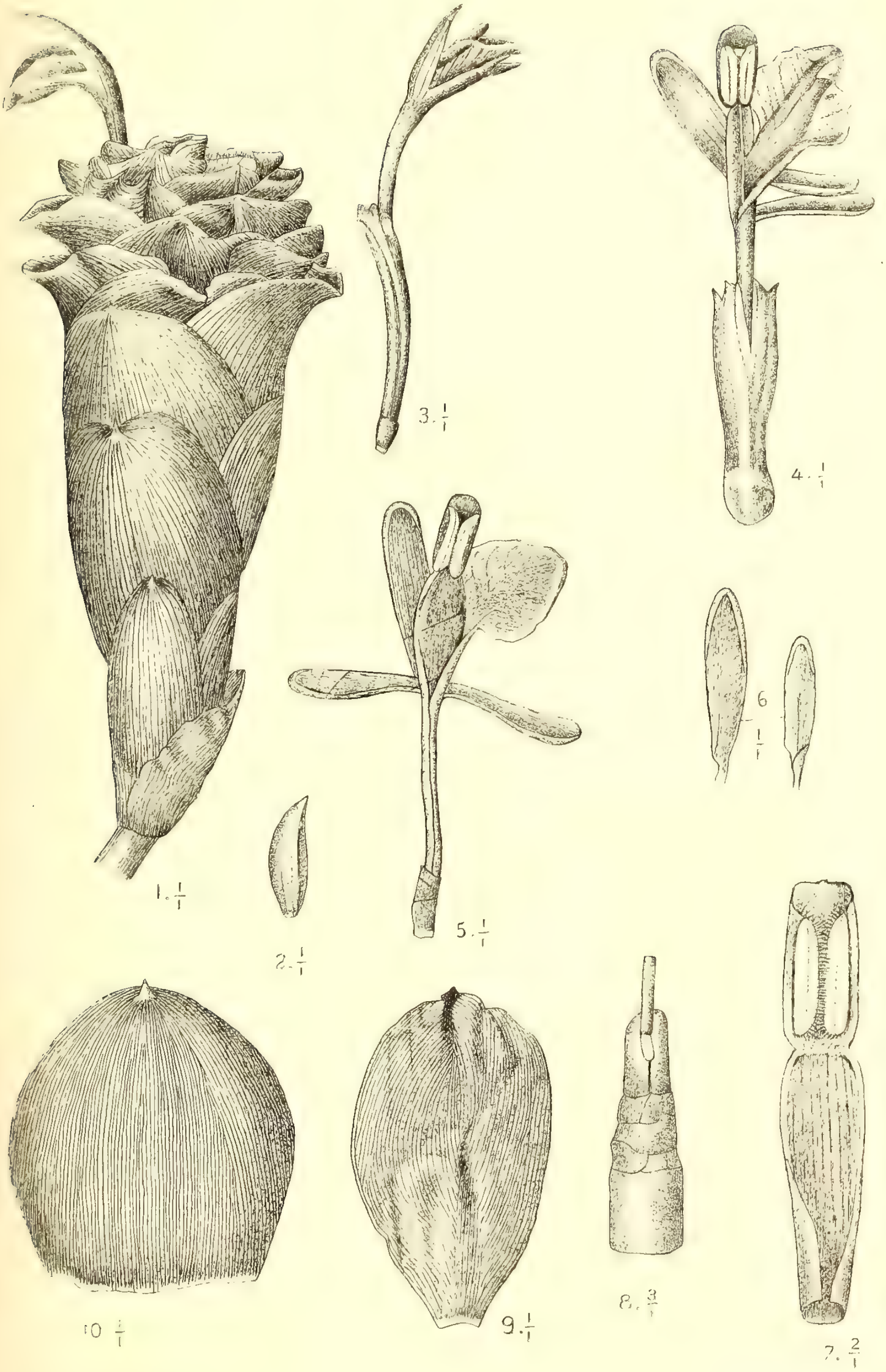
R Natadipoera del

M Kromohardjo lith.

Hornstedtia cyathifera Val.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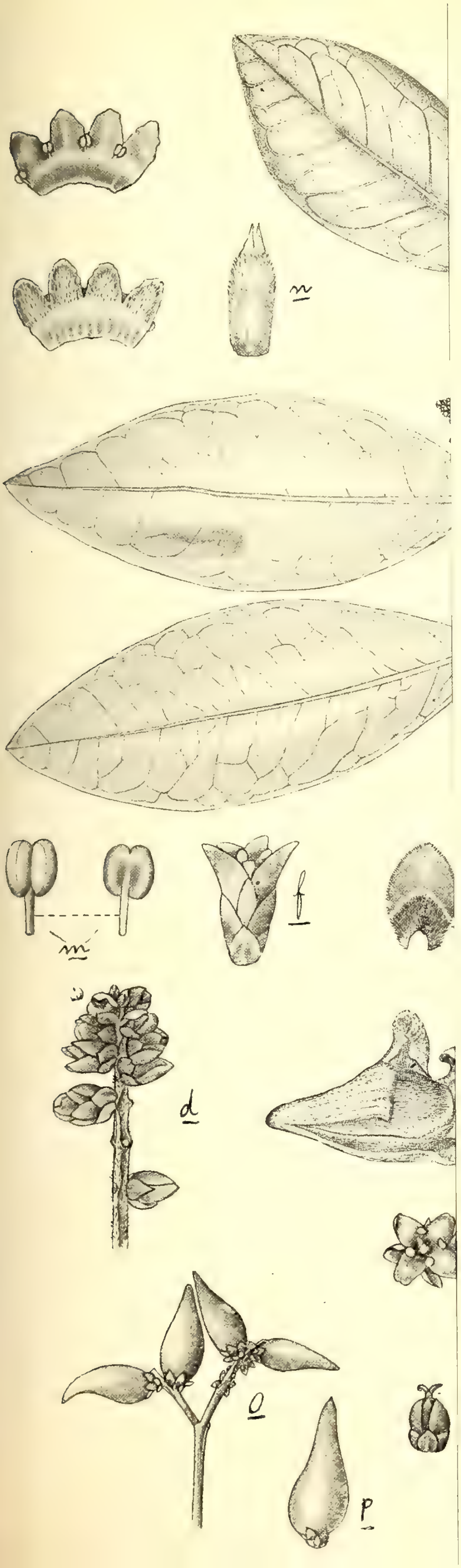
R. Natadipoera del. M.Kromohardjo lith

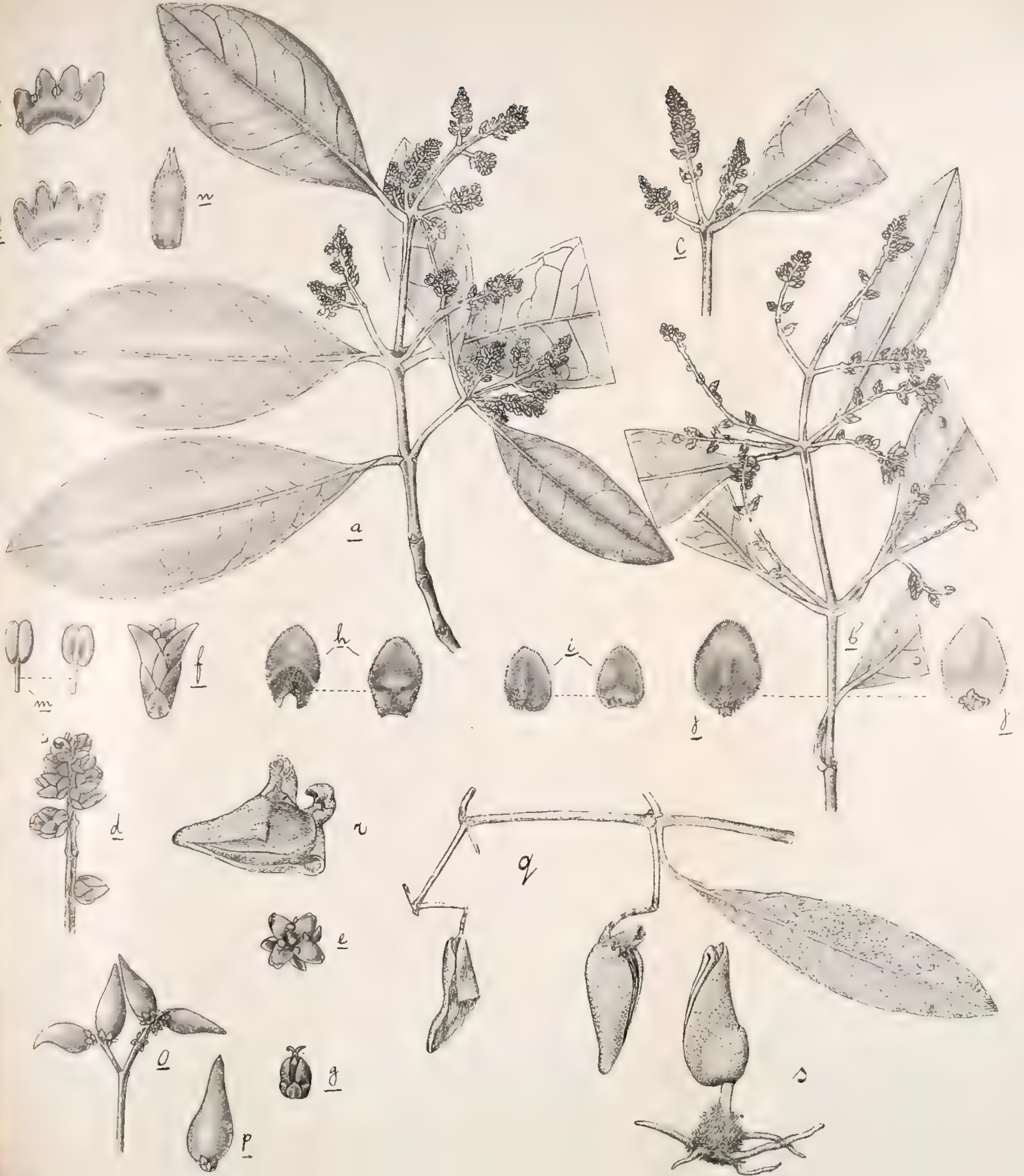
Hornstedtia rubra Val.

Bull. Jard. Botan. Buitenzorg, Série III, Vol. III.
R. C. Bakhuizen v. d. Brink, Rev. Gen. Avicenniae.



Bull. Jard. Botan. Buitenzorg, Série III, Vol. III.
R. C. Bakhuizen v. d. Brink, Rev. Gen. Avicenniae.

Tab. 14.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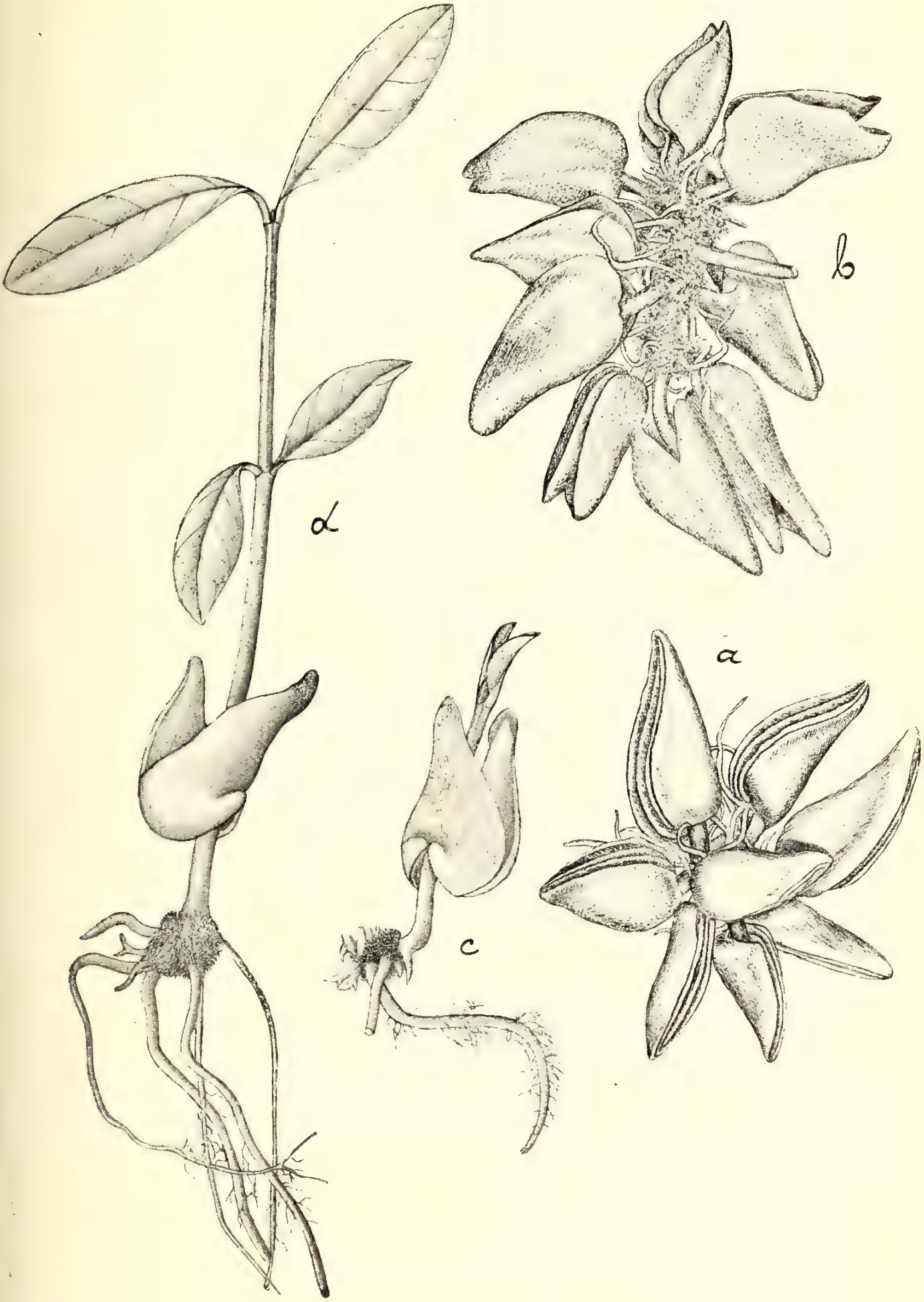
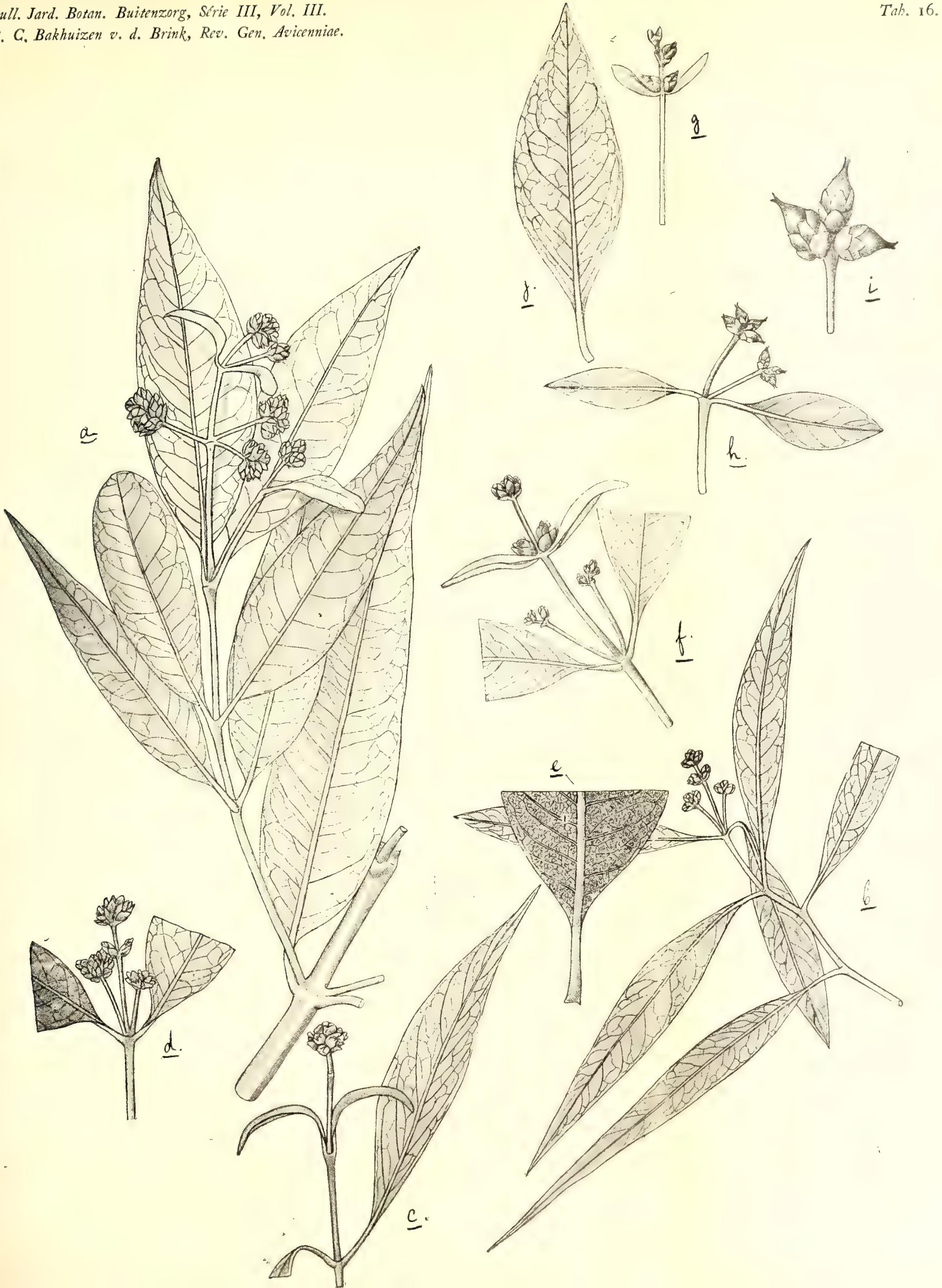


Soemawinata del.

Avicennia marina (Forsk.) Vierh. var. alba (Bl.) Bakh.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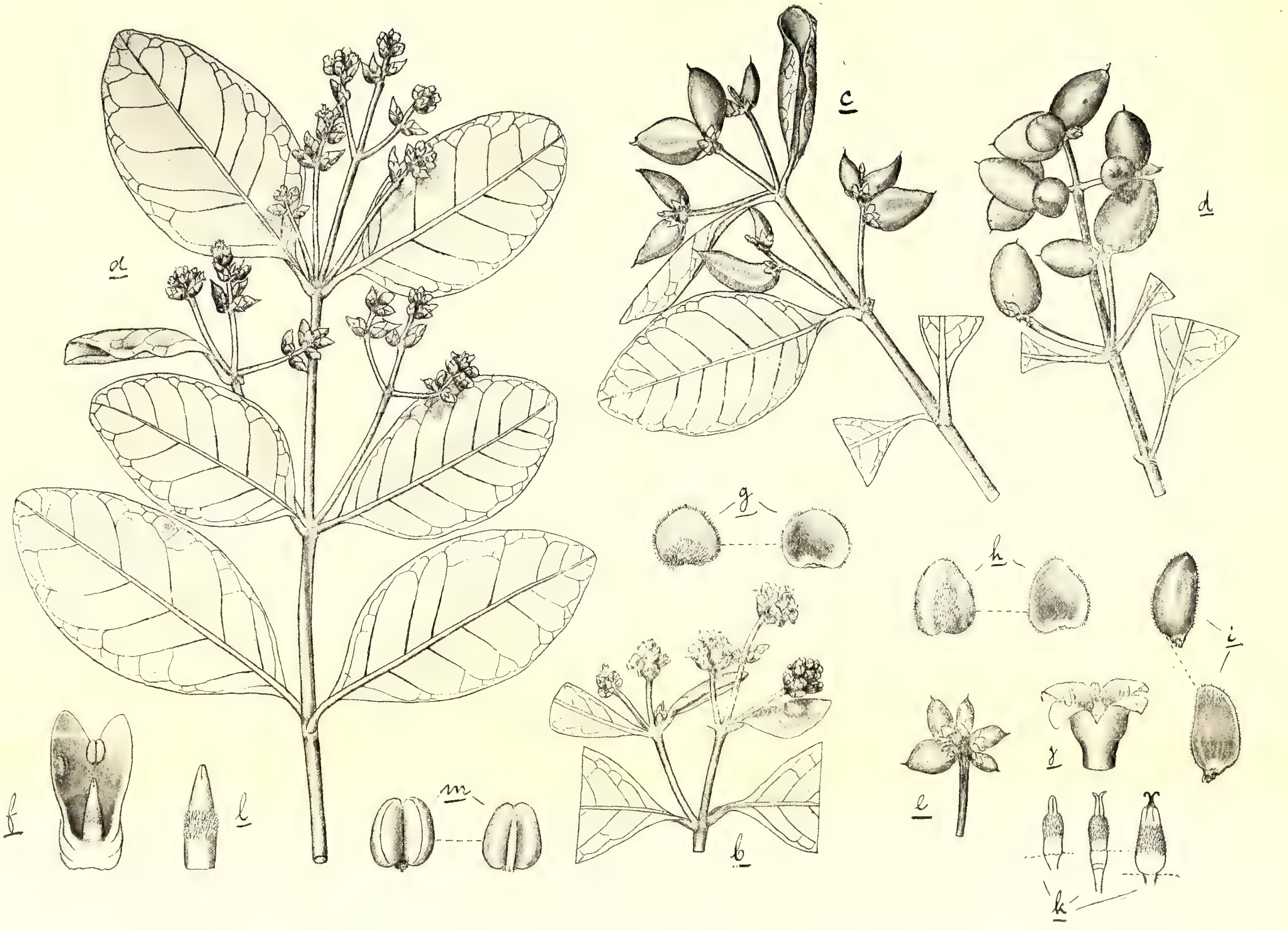
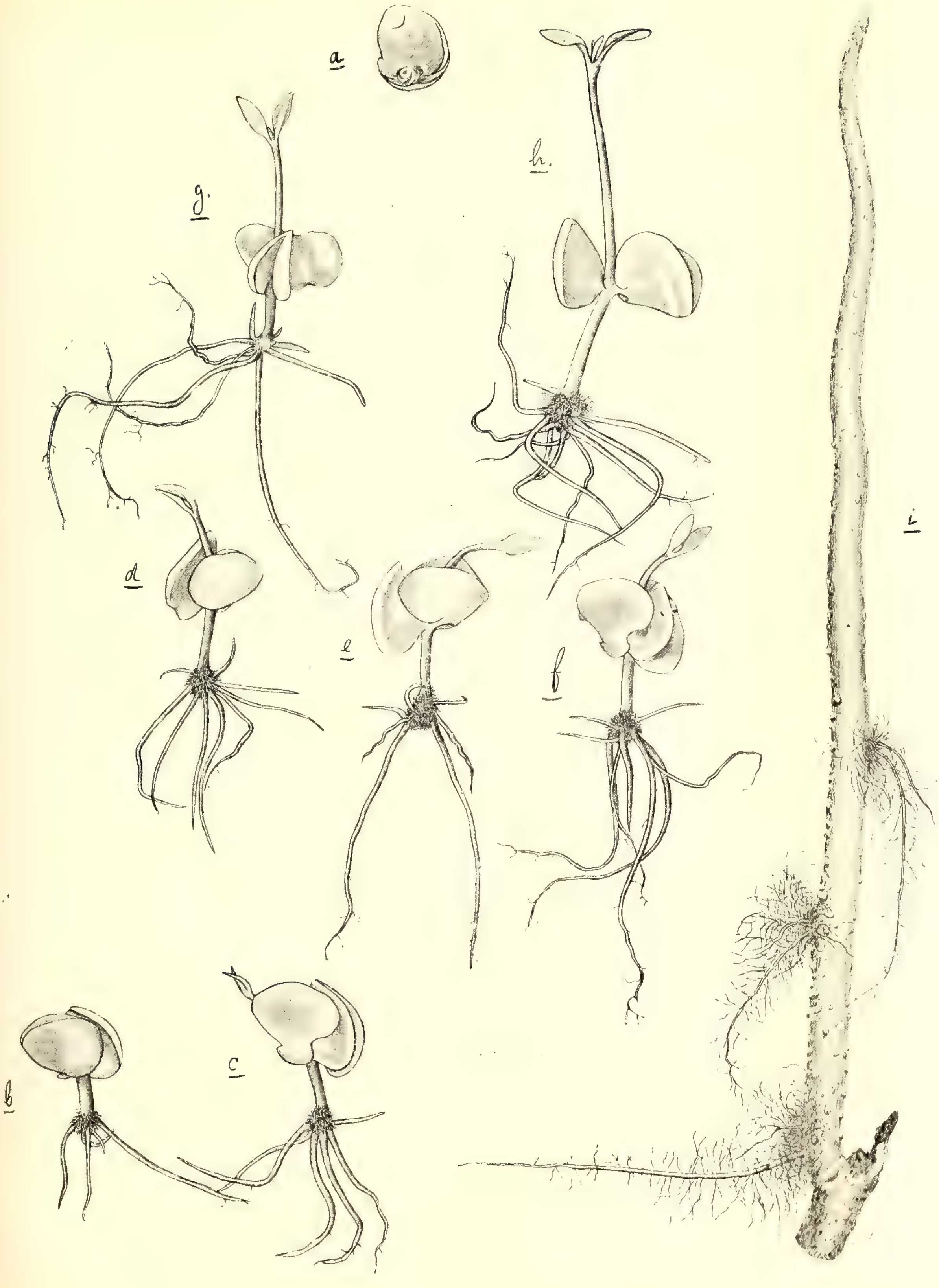


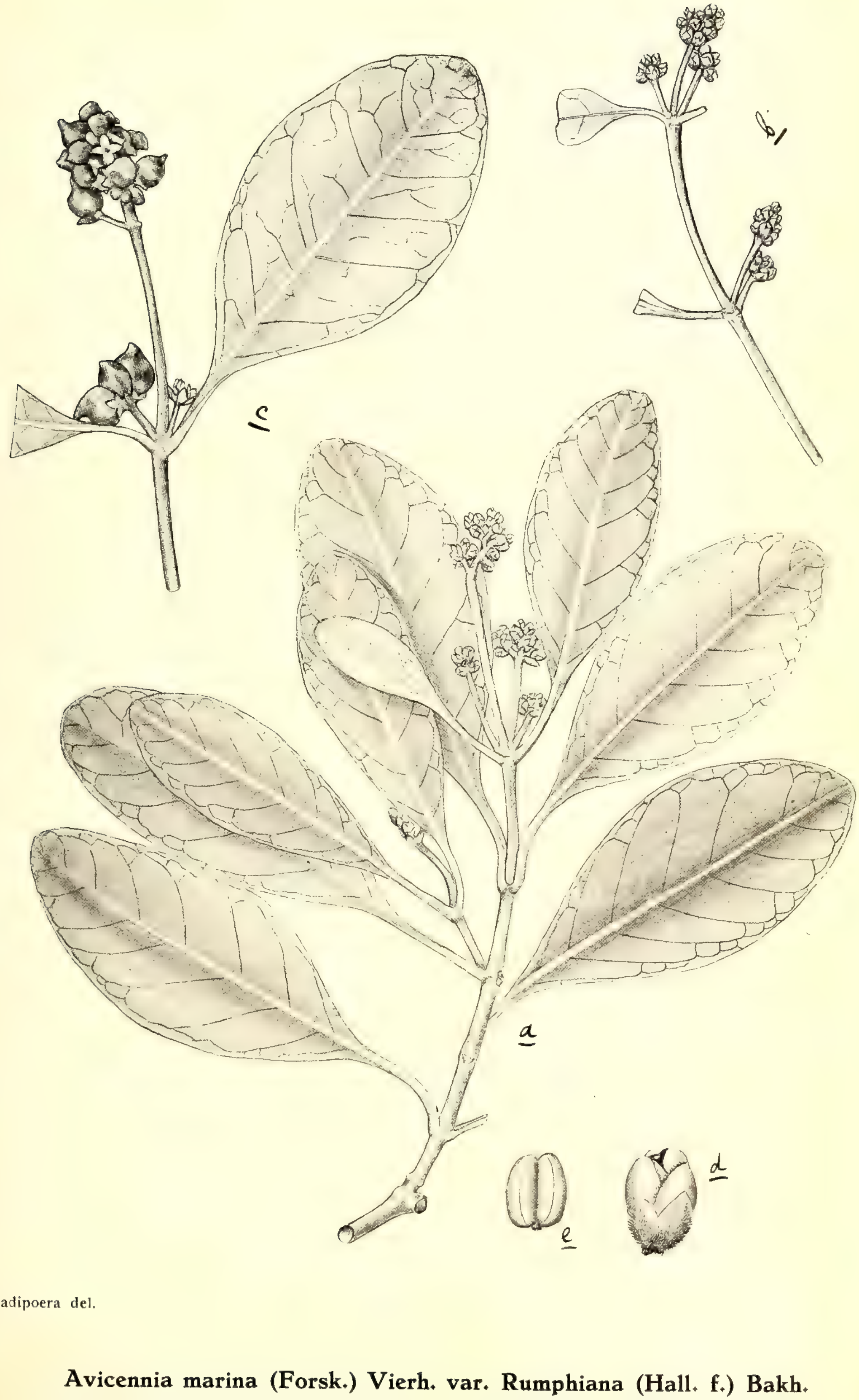
Natadipoera del.

Avicennia marina (Forsk.) Vierh. var. intermedia (Griff.) Bakh.



Natadipoera et Soemawinata del.

Avicennia marina (Forsk.) Vierh. var. intermedia (Griff.) Bakh.



Natadipoera del.

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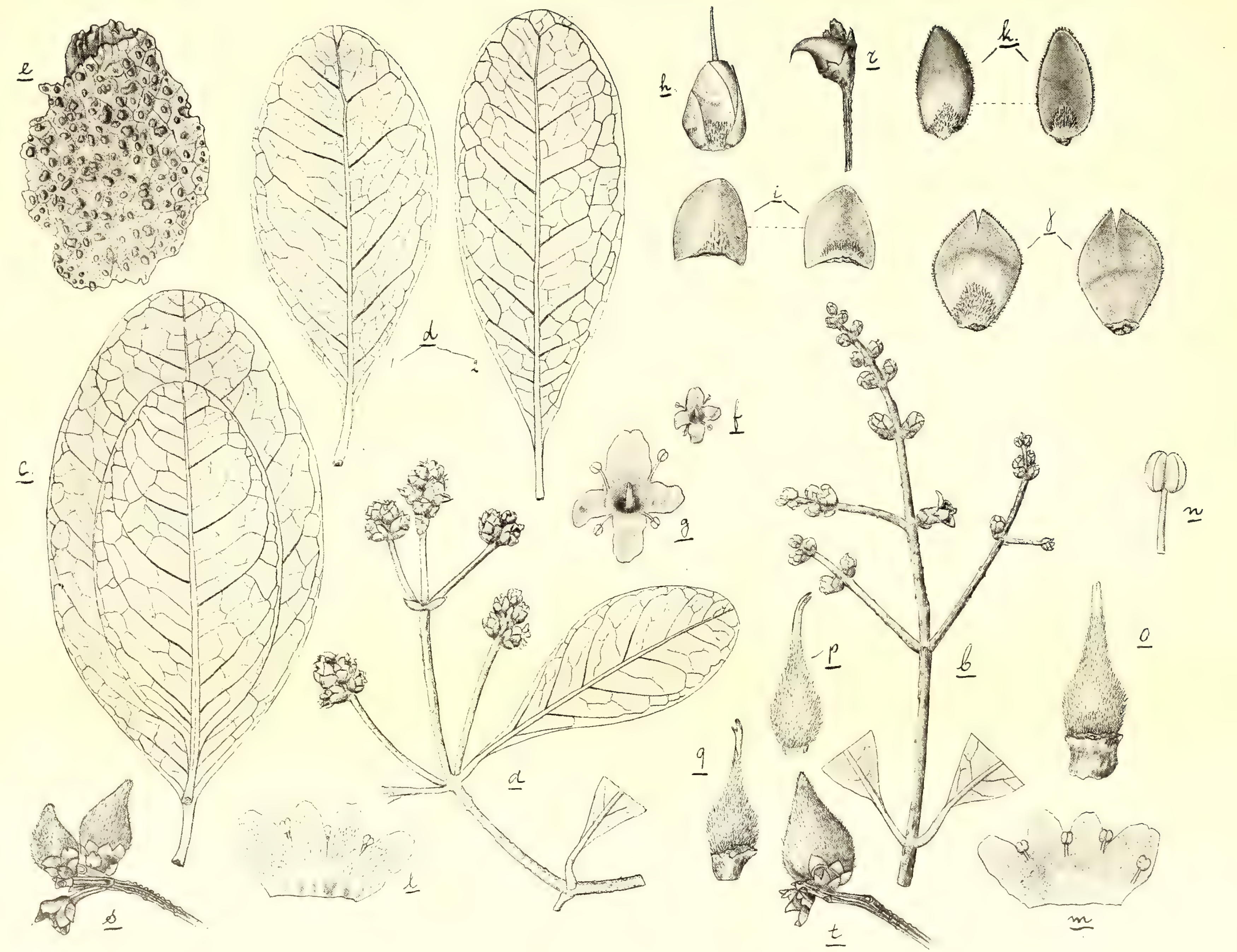
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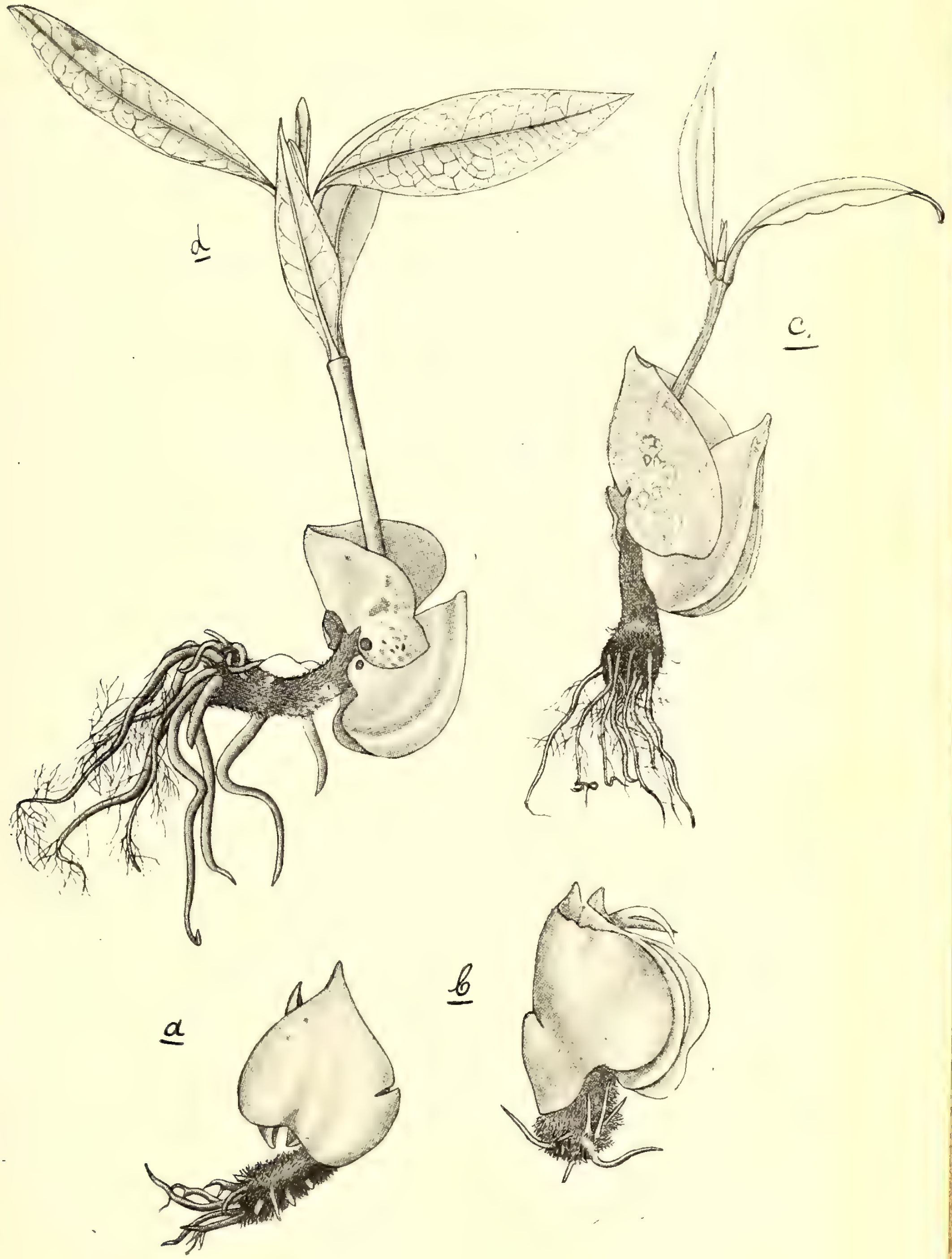
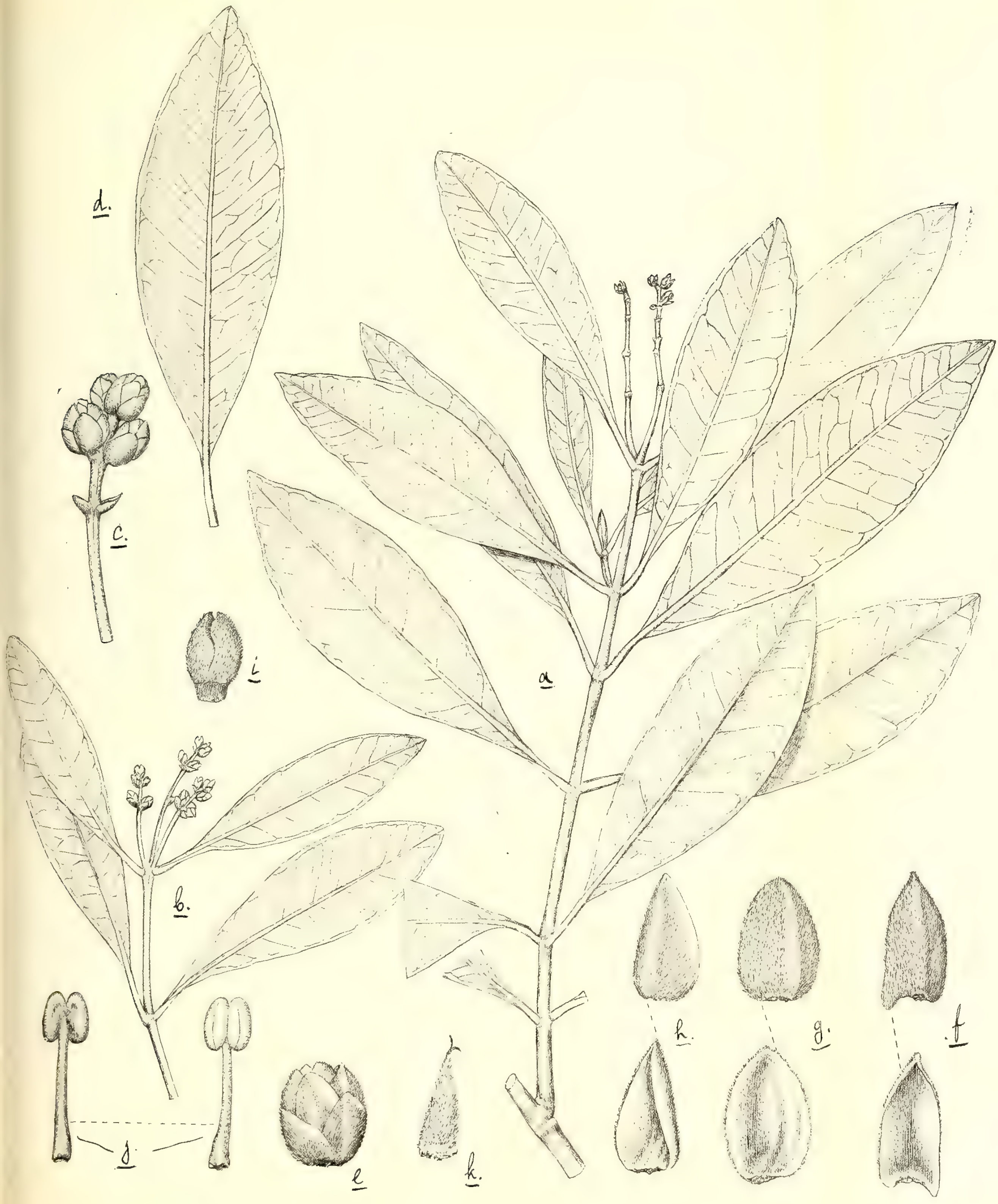
Natadipoera del.

Avicennia officinalis L.



Soemawinata del.

Avicennia officinalis L.



Natadipoera del.

Avicennia nitida Jacq.

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DEPARTEMENT VAN LANDBOUW, NIJVERHEID EN HANDEL

Buitenzorg, Java

„'S LANDS PLANTENTUIN"
(„JARDIN BOTANIQUE DE BUITENZORG")

Bulletin du Jardin Botanique

Rédigé par les Docteurs ès Sciences Naturelles:

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Chef des Laboratoires Botaniques des étrangers

et

J. J. SMITH,
Chef de l'Herbarium

Série III.

Volume III.

Livraison 3.

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DIE ORCHIDEEN VON JAVA

von

J. J. SMITH.

Sechster Nachtrag.

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* **Platanthera angustata** LNDL. Gen. et sp. Orch. (1835), 290; MIQ. Fl. Ind. Bat. III, 714; KRZL. Orch. gen. et sp. I (1901), 647; J. J. S. in Fl. Buit. VI, Orch. (1905); 29.--*Mecosa angustata* BL Bijdr. (1825), 404; Tab. fig I.

Rhizoma abbreviatum, radicibus crasse carnosis, teretibus. Folia radicalia erecta, petiolata, ovata ad ovato-elliptica, breviter acute acuminata, curvinervia, reticulato--venosa, costa media supra canaliculata subtus carinata, nervo 1 subconspicuo subtus sulcato utrinque, ceteris tenuibus, nervis venisque saepe supra plus minusve prominentibus, herbacea, supra nitidule viridia, c. 12--14.5 cm. longa, 5--7 5 cm. lata; petiolus basi excepta canaliculatus, c. 4.25--9 cm. longus. Inflorescentiae erectae, laxe multiflorae, pedunculo internodio infimo excepto vaginularum marginibus decurrentibus costato, superne plus minusve alato, dilute viridi, ad c. 41--46 cm. longo, vaginulis foliaceis c. 4 remotis patentibus sessilibus amplexicaulibus ovatis acute acuminatis basi plus minusve cordatis usque ad 9.5--10 cm. longis superne decrescentibus et in bracteas vergentibus donato, rachide serpentina, biangulata, dilute viridi, c 17.5--34 cm. longa. Bracteae patentes, rachidem semiamplectentes, ovatae, longe acuminatae, basi rotundatae cum marginibus decurrentibus, virides, inferiores ad c. 1.8--2.5 cm. longae, superiores decrescentes. Flores quaquaversi, patentes, recurvi, dilute virides, c. 0.7 cm. lati, cum calcari c. 2--3 cm. longi. Sepalum dorsale erectum, ovatum, obtusum, concavum, 3nervium, c. 0.67--0.85 cm. longum, 0.5--0.6 cm. latum. Sepala lateralia ad faucem calcaris et basin petalorum inserta, reflexa, apice recurva, oblique ovato-oblonga, extrorsum falcata, apicem versus angustata, obtusa, basi obliqua, convexa, 3nervia, c. 0.8--0.9 cm. longa, 0.27--0 35 cm. lata. Petala erecta, basi gynostemii et labelli adnata, sepalo dorsali leviter agglutinata, oblique subovato-triangula, leviter sigmoidea, apicem versus sensim angustata, anguste obtusa, margine antico basi rotundato--lobata, concava, 2nervia, c. 0.7--0.9 cm. longa, 0.33--0.35 cm. lata Labellum calcaratum, decurvum. simplex, lineari--triangulum, e basi vix dilatata apicem versus sensim angustatum, obtusum, convexum, carnosulum, dilute viride, c 1.1 cm. longum, basi 0.3--0.33 cm. latum; calcar dependens, ovario parallelum, curvatum, teres, apice leviter attenuatum, dilute viride, c. 1.4--1.6 cm. longum. Gynostemium cum ovario angulum obtusum

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faciens, latum, basi tenue, pallide viride, c. 0.45 cm. longum, 0.35 cm. latum, auriculis parvis verruculosis; anthera magna, oblique truncata, thecis connectivo lato hippocrepidiformi semipellucido sejunctis, parallelis, clavatis, verticalibus, a latere compressis. Pollinia 2, oblique pyriformia, pallide flavescentia, cum caudicula tenui et glandula orbiculari c. 0.35 cm. longa. Rostellum brevissimum, late obtusangule triangulum. Stigma ad basin gynostemii, transverse oblongum. Ovarium praesertim superne curvatum.

Java: Banten, Goenoeng Halimoen. (H. ZOLLINGER). Goenoeng Karang. (J. C. VAN HASSELT).

Batavia, Buitenzorg, Goenoeng Botol bei Nirmala in 1800 m ü. d. M., im Urwalde; 1 Ex. (C. A. BACKER n. 10739, bl. im Dezember 1913). Krawang, auf dem Boerangrang. (C. L. BLUME). Ebenda, am Nordhang in 1500 m ü. d. M. auf einem Bergrücken im Urwalde, zahlreich. (C. A. BACKER. n. 14485, bl. im Juli 1914; R. C. BAKHUIZEN VAN DEN BRINK, bl. im Juli 1920).

Auf dem Salak, in 700—1000 m ü. d. M. (H. ZOLLINGER) Ebenda, oberhalb Pasir Pogor in 1800 m ü. d.M, im Urwalde, viel. (C. A. BACKER n. 9268, bl. im September 1913; auch G. OVERDIJKINK). Ebenda, auf der Spitze in 2215 m ü. d. M. (MANGOENKROMODIREDJO, KDS. n. 36726β, bl. und fr. im Mai 1910). Ebenda, Goenoeng Gadjah, 1500 m, im Walde, viel. (R. C. BAKHUIZEN VAN DEN BRINK JR., bl. im August 1920).

Priangan, Tjiandjoer, auf dem Gede bei Tjibeureum in c. 1800 m ü. d.M. im Urwalde (H. HALLIER, J. J. SMITH). Ebenda, am Südhang in 2000 m ü. d.M., im Urwalde, mehrere Exemplare zerstreut. (C. A. BACKER n. 14744, bl. im Juli 1914). Auf dem Gegerbintang in 1950 m ü. d. M., im Urwalde, allgemein. (L. G. DEN BERGER n. 618, bl. im September 1918). Bandoeng, Goenoeng Patoeha am Kratersee des Kawah Poetih, in 2200—2300 m ü. d. M., auf steinigem Boden. (J. J. DUYFJES; C. A. BACKER n. 12656, bl. im März 1914). Garoet, Goenoeng Mandalagiri. (H. J. LAM, kult. in Hort. Tjibodas n. 25).

Pekalongan, Goenoeng Prahoe in c. 1700 m ü. d. M., auf einem trocknen, kahlen, ziemlich fruchtbaren Bergrücken zwischen *Gleichenia;* nicht selten. (J. A. LÖRZING n. 307, bl. im März 1913). Goenoeng Prabakta in 1550 m ü. d. M., im humusarmen Walde, mehrere Exemplare. (C. A. BACKER n. 16006, bl. im September 1914).

Pekalongan-Banjoemas, Goenoeng Rogodjembangan, in 2000 m ü. d.M., im Walde auf einem trocknen Bergrücken, viele Exemplare. (C. A. BACKER n. 16152, bl. im September 1914).

Bagelen, auf dem Dieng, am Südhang in 1800 m ü. d. M., zwischen Sträuchern, 1 Ex. (C. A. BACKER n. 21842, fr. im Januar 1917).

Peristylus tentaculatus J. J. S. in Fl. Buit. VI, Orch. (1905), 35; Atlas Fig. XVII (excl. syn.).

Glossula tentaculata LNDL. ist nach der Tafel in Bot. Reg. verschieden durch viel längere Seitenlappen der Lippe und einen spitzen Mittellappen, und bei *Coeloglossum lacertiferum* LNDL. ist der Mittellappen der Lippe nach der Beschreibung länger als die Seitenlappen, so dass die l. c. beschriebene Pflanze in diesem Augenblick als eine eigene Art anzusehen ist.

***Habenaria reflexa** BL. Bijdr. (1825), 403; LNDL. Gen. et sp. Orch. (1835), 317; RCHB. F. in Bonpl V (1857), 35; KRZL. in ENGL. Bot. Jahrb. XVI (1893), 169; Orch. gen. et sp. I (1897), 367; J. J. S. in Fl. Buit. VI, Orch. (1905), 39; Atlas, Fig. XX.

Caulis brevis, 7--15 cm. longus, c. 8--9folius et nonnullis vaginis ad basin. Folia patentia, recurvula, elliptico-oblonga ad lanceolata, acuminata, acuta, basi angustata et amplexicaulia, undulata, costa media supra canaliculata subtus conspicue albido-prominente, curvinervia, reticulato-venosa, utrinque nitidissime viridia, membranacea, intermedia maxima ad c. 14--21 cm. longa, 4 8--6,5 cm. lata; vaginae tubulosae, amplectentes. Inflorescentia stricta, laxe multiflora, pedunculo tereti, interrupte seriatim papilloso-puberulo, glaucescenti-viridi, c. 15 cm. longo, vaginulis foliaceis c. 6 erectis semiamplexicaulibus ovato-oblongis ad lanceolatis acute acuminatis praesertim inferne undulatis superioribus decrescentibus et in bracteas vergentibus donato, rachide pedunculo simili, c. 15—18 cm. longa. Bracteae adpressae, ovato-lanceolatae, longe acuminatae, concavae, ciliolatae, 3nerviae, subsemipellucidae, glaucescenti-virides, ad c. 2.2--2.3 cm. longae, 0.7 cm. latae. Flores mediocres, erecto-patentes, nutantes, c. 1.5 cm. longi. Sepalum dorsale erectum, reflexum, cum ovario angulum acutum faciens, orbiculare, valde galeiformi-concavum, margine papillosum, 3nervium, costa media dorso ad apicem prominula papillosaque, dilute viride, inexplanatum c.0.36 cm. longum, 0.38 cm. latum. Sepala lateralia reflexa, basi satis angusta inserta, margine antico maxime dilatata rotundata et medio margine reflexo excepto cucullato-excavata, margine antico dimidio inferiore et margine postico anguste revoluta et papillosa, apice leviter triangulo-producta et recurvula, anguste obtusa, nervis 3 valde curvatis, subsemipellucida, pallide viridia, c. 0.5--0,55 cm. longa, 0.85--0.9 cm. lata, basi c. 0,2 cm. lata. Petala sepalo dorsali agglutinata, oblique triangula, subfalcatula, obtusa, basi lata, margine postico subrepandula, 1nervia, subsemipellucida, pallide viridia, c. 0.375 cm. longa, basi 0.23 cm. lata. Labellum 3partitum, calcaratum, basi lata gynostemio adnatum, supra basin reflexum convexumque et utrinque carina obliqua instructum, cum calcari angulum rectum faciens, opacum, pallide viride, laciniis lateralibus dependentibus, cum lacinia intermedia sinum rotundatum formantibus, infra medium obtusangule incurvulis, anguste linearibus, subacutis, supra convexis subtus subplanis, fere 0.8 cm. longis, basi 0.1 cm. latis, lacinia intermedia multo longiore, valde undulata, basi deflexa, supra basin obtusangule recurva, ante medium valde incurva, apice valde recurva, lineari, supra convexa, subtus concava, c.1.55 cm. longa, basi 0.3 cm., medio fere 0.1 cm. lata; calcar reversum, ovario adpressum, paulum infra medium maxime incurvum, basi valde infundibuliforme et a dorso compressum subtus convexum, medio teres et tenue, parte superiore clavatum brevissime acuminatum et facie dorsali carinatum, semipellucidum, pallide viride, pariete postico basi intus triangulo-viride, explanatum c. 1.7 cm. longum. Gynostemium sub sepalo dorsali absconditum, erectum, reversum, latissimum, dorso convexum, pallide viride, ad apicem canalium c. 1.15 cm. latum, auriculis oblique oblongis, verrucosis, albis. Anthera apice late rotundata, thecis connectivo satis lato sejunctis, clavatis, canalibus elongatis, porrectis, obtusangule divergentibus. Pollinia bipartita, flava, cum stipite longissimo et glandula mediocri c. 0.9 cm. longa. Rostellum breve, late rotundato-triangulum, carnosum, margine angusto erosulum, pallide viride, laciniis lateralibus antherae canales aequantibus. Stigmata brevia, valde gibbosa, verruculosa, nitida, pallide viridia. Ovarium e basi breviter pedicellata longe fusiforme, deinde longissime et tenuiter rostratum et apice incrassatum, omnino 6sulcatum et velutino-viride, totum c. 2.2 cm. longum, ovario 1.1 cm., rostro 0.87 cm. longo.

Java: Banten, Bodjong Manik. (S. H. KOORDERS n. 40808β, bl. im Juli 1912).

Priangan, Bandoeng. (H. ZOLLINGER).

Besoeki, Poeger, G. Watangan. (S. H. KOORDERS n. 29940β, bl. im Februar 1898). Idjen-Gebirge. (H. ZOLLINGER).

Poeloe Kangean, Goenoeng Eteng bei Tambajongan, in 150--200 m ü. d. M., auf Kalkbergen im Urwalde zerstreut. (C. A. BACKER n. 27963, bl. im April 1919; auch leb. Pfl. kult. in Hort. Bog.). Batoe Poetih, in 150 m ü. d. M., im sekundären Walde auf Kalkfelsen. (C. A. BACKER n. 27786, bl. im März 1919).

Beschreibung nach im Buitenzorger Botanischen Garten zur Blüte gelangten, von der Insel Kangean stammenden Exemplaren.

Corysanthes picta LNDL. Gen. et sp. Orch. (1840), 394; BL. Fl. Jav. Orch. (1858), 147, t. 64, f. 1; MIQ. Fl. Ind. Bat. (1855), 715; J. J. S. in Fl. Buit. VI, Orch. (1905), 51; Atl. fig. XXIX. — *Calcearia picta* BL. Bijdr. 418; Tab. fig. XXXIII. -- *Corybas pictus* O. K. Rev. gen. pl. II (1891), 657.

*var. **karangensis** J. J. S. n. var.

Tuber subglobosus, longe pilosus, c. 0.8 cm. longus. Caulis hypogaeus albidus, pilis fasciculatis basi connatis patentissimis longissimis tenuibus c. 0.6 cm. longis vestitus, c. 0.4 -- 0.9 cm. longus, nonnullis squamis triangulis, donatus, stolones teretes albos fasciculato-pilosos c. 5 cm. et plus longos emittens. Caulis epigaeus subteres, folii marginibus decurrentibus antice canaliculatus, glaber, pallide virescens, c. 0.7 -- 2.7 cm. longus, vagina adpressa basi tubulosa subulato-acuminata carinata pallida apice dilute viridi c. 0.65 -- 0.7 cm. longa ad basin. Folium orbiculari-cordatum, breviter abrupte acute acuminatum, lobis basilaribus late rotundatis sinu acutangulo sejunctis, costa media dorso carinata, nervis c. 7 valde arcuatis inter marginem anastomosantibus, venis paucis transversis laxe reticulatum, viride, nervis venisque tenuibus argenteis vel purpurascentibus, c. 1.2--2.4 cm., cum lobis basilaribus 1.5--3.1 cm. longum, 1.3--3 cm. latum. Inflorescentia sessilis, 1flora. Bractea elongato--subulata, acutissima, concava, c. 0.9--1.6 cm. longa. Flos mediocris, pulcher, reversus. Sepalum dorsale basi reversum, valde arcuato-incurvum, inferne labello adpressum, concavum et longitudinaliter canaliculatum, dorso convexum cum costa longitudinali obtusa intus canaliculata, e basi anguste unguiculata usque ad c. $^{1}/_{3}$ supra basin cuneato-dilatata mesochylium subquadratum formans, $^{1}/_{3}$ superiore conspicue dilatatum, 3lobum, apice subtruncatum et medio abrupte in lobulum apicalem triangulum acutum plus minusve crenulato-undulatum acuminatum, lobis lateralibus patentissimis oblique triangulis obtusis, basi 3-, supra basin 7nervium, album, superne macula magna irregulari atropurpurea plus minusve albo-punctata vel striolata ornatum et plus minusve purpureo-striatum, c. 2 cm. longum, basi 0.325 cm., medio fere 0.7 cm., superne 1.6 cm. latum. Sepala lateralia elongato-linearia, apicem versus sensim angustata, canaliculata, dorso obtuse carinata, 1nervia, alba vel pallide virescentia, c. 5.1 cm. longa, basi bene 0.1 cm. lata. Petala sepalis lateralibus similia, c. 5.8 cm. longa, 0.15 cm. lata. Labellum conspicuum, inexplanatum c. 1.4 cm. longum, reversum, infra medium arcte recurvum, basi 2calcaratum, dorso carinatum, marginibus incurvis tegentibus tubulosum, limbo ampliato, concavo, apice longius et anguste lacinulato, inferius eroso, basi callo conspicuo antice rotundato donato, explanato transverse quadrangulo--ovali, apice retuso rotundato-bilobulo, c. 1.8 cm lato, 1.55 cm. longo, atropurpureum, plus minusve albido-punctatum vel striolatum, macula magna alba notatum, margine interdum apice excepto albidum, calcaribus porrectis, lateraliter compresso-conicis, anguste obtusis, extus pallidis, c. 0.3 cm. longis. Gynostemium breve, reversum, cum ovario angulum rectum faciens, purpurascens, c. 0.24 cm. longum, basi callo conspicuo transverso supra concavo et purpurascenti subtus convexo apice late retuso basi labelli adnato intructum. Anthera basi lata inserta, porrecta, cucullata, apice bilobula cum dente triangulo in sinu. Stigma orbiculari-triangulum, margine valde elevato concavum. Ovarium sessile, recurvum, 5sulcatum, costis alternatim dilute viridibus et virecenti-albis, c. 0.5 cm. longum.

Java: Priangan, Gipfel des Goenoeng Karang bei Tjibeber, in 1230 m ü. d. M., viele Exemplare auf einer einige Quadratmeter grossen Stelle. (W. F. WINCKEL, bl. im November 1917, kult. unter n. 385).

Ich glaube diese Pflanze vorläufig am Besten als eine Varietät der *C. picta* LNDL. anzusehen. Nach BLUMEs Figur und Beschreibung unterscheidet sie sich durch anders gefärbte Blätter und Blüten, gegen die Spitze weniger verschmälerte und weniger wellige Blätter. Leider ist *C. picta* LNDL. noch nicht wiedergefunden und braucht besonders die Richtigkeit der Färbung näherer Bestätigung.

C. limbata HOOK. F. ist sehr nahe verwandt, hat aber nach der Tafel (Bot. Mag. t. 5357) kürzere Sepalen und Petalen, eine nicht 2lappige Lippe, kleinere Blätter, eine kürzere und breitere Braktee. Es ist leider unbekannt aus welcher Gegend von Java diese Art herrührt.

Beschreibung nach in Formalin konservierten Exemplaren, die ihre Färbung vollkommen behalten hatten.

Corysanthes picta LNDL. var. *karangensis* J. J. S.

Knollen nahezu kugelig, lang behaart, c. 0.8 cm lang. Unterirdischer Stengel weisslich, mit langen, dünnen, weit abstehenden, c. 0.6 cm langen Büschelhaaren, c. 0.4—0.9 cm lang, mit einigen dreieckigen Schuppen, einige stielrunden, weissen, büschelhaarigen, c. 5 cm und mehr langen Ausläufer treibend. Oberirdischer Stengel ungefähr drehrund, vorn durch die herablaufenden Blattränder rinnig, kahl, blassgrünlich, c. 0.7—2.7 cm lang, mit einer anliegenden, an der Basis röhrigen, pfriemlich zugespitzten, 0.65—0.7 cm langen Scheide am Grunde. Blatt rundlich herzförmig, kurz spitz zugespitzt, mit breit abgerundeten Fusslappen, mit c. 7 stark gekrümmten Nerven, die durch wenige Queradern verbunden sind, grün mit silberweissen Nerven und Adern, c. 1.2—2.4 cm, mit den Fusslappen 1.5—3.1 cm lang, 1.3—3 cm breit. Blütenstand sitzend, 1blütig. Braktee verlängert pfriemlich, sehr spitz, konkav, c. 0.9—1.6 cm lang. Blüte mittelgross, schön, zurückgerichtet. Unpaares Sepalum stark eingebogen, der Lippe parallel, konkav, aussen mit einer Längsrippe, aus schmal nagelförmigem, bis zu $^1/_3$ über der Basis keilig verbreitertem Grunde in ein nahezu vierkantes Mesochyl verbreitert, das obere $^1/_3$ ziemlich stark verbreitert und 3lappig, an der Spitze nahezu abgestutzt und abgebrochen in das dreieckige, spitze Endläppchen zugespitzt, die Seitenläppchen weit abstehend, schief dreieckig und stumpf, am Grunde 3-, über der Basis 7nervig, weiss, nach oben mit einem grossen, unregelmässigen, purpurnen Flecken, c. 2 cm lang, an der Basis 0.325 cm, in der Mitte 0.7 cm, oben 1.6 cm breit. Paarige Sepalen und Petalen verlängert linear, rinnig, 1nervig, blassgrünlich, c. 5.1 und 5.8 cm lang, 0.1 und 0.15 cm breit. Lippe gross, unausgespreizt 1.4 cm lang, unterhalb der Mitte knapp zurückgekrümmt, an der Basis 2spornig, durch eingebogene, einander überdeckende Ränder röhrig, nach oben erweitert und konkav, der vordere Teil ziemlich lang und schmal zerschlitzt, mit einem grossen, vorn abgerundeten Callus im Schlunde, der vordere Teil ausgespreizt quer viereckig oval, an der Spitze kurz abgerundet 2lappig und mit einer Pfriemspitze im Sinus, c. 1.8 cm breit und 1.55 cm lang, dunkel purpurn, mit einem grossen, weissen Flecken und ausser der Spitze blass berandet; Sporne vorgestreckt, seitlich zusammengedrückt kegelig, schmal stumpf, c. 0.3 cm lang. Säule kurz, zurückgerichtet, blasspurpurn, 0.24 cm lang, an der Basis mit einem grossen, konkaven, unten konvexen, der Lippe am Grunde angewachsenen Quercallus. Anthere mit breiter Basis inseriert, kappig, an der Spitze 2lappig und mit einem kürzeren, dreieckigen Zahn. Narbe rundlich dreieckig, mit stark

erhabenem Rande. Fruchtknoten sitzend, zurückgekrümmt, 6furchig, die Rippen abwechselnd hellgrün und grünlichweiss, c 0.5 cm lang.

Corysanthes vinosa J. J. S. n. sp.

Tuber globosus, albidus, c. 0.4--0.45 cm. diam. Caulis hypogaeus longe pilosus, albus, superne pallide virescens, 1,3—1.8 cm. longus, nonnullis vaginis donatus. Caulis epigaeus marginibus folii decurrentibus antice usque ad basin bicostatus, glaber, pallide virescens, c 2—2.75 cm. longus, vagina tubulosa longe et tenuiter mucronata c. 0.8—1 cm. longa ad basin. Folium sessile, acutum, longe mucronato-acuminatum, lobis basilaribus oblique rotundatis parallelis sinu angusto separatis, leviter undulatum, in utraque parte costae mediae supra sulcatae subtus prominentis nervis lateralibus c. 3—4 (nervis in lobis basilaribus exceptis) irregularibus curvatis intra marginem anastomosantibus supra vix prominulis, supra opacum, atroviride, subtus nitidum, c. 1.5—1.7 cm., cum lobis basilaribus 2.2—2.45 cm. longum, 1.5— fere 2 cm. latum. Bractea erecta, linearis, longe filiformi-acuminata, canaliculata, semipellucida, pallide viridis, c.1.35 cm. longa. Flos erectus, mediocris. Sepalum dorsale conspicuum, erectum, valde incurvum, labellum obtegens, concavum, spathulatum, ex ungue lineari superne paulo dilatato in laminam late cuneatam late rotundatam margine apicali erosulam dilatatum, basi 3nervium, costa media dorso carinata, nervo 1 in lamina ramosa utrinque, nervis omnibus dorso prominentibus verrucosisque, inter nervos verrucosum, atropurpureum, margine apice excepto nervis punctisque inconspicue albido-hyalinum, explanatum c. 2.1 cm. longum, ungue c. 1 cm. longo, basi 0.25 cm. lato, lamina c. 1.1 cm. longa, 1.3 cm. lata. Sepala lateralia inter calcaria adscendentia, arcuata, e basi triquetra intus concava filiformia, papillosa, basi virescenti-albida, superne purpurea, parte superiore deficiente. Petala sepalis lateralibus similia, e basi lineari concava dorso carinata longe filiformia, antice sulcata, papillosa, $^2/_5$ partibus inferioribus virescenti-albida, basi purpureo-punctata, superne purpurea, c. 3.4 cm. longa. Labellum erectum, valde recurvum (apice deficiente), infundibuliformi-convolutum, marginibus inferne tegentibus tubum a latere compressum formans, antice apertum, margine papilloso-erosulum, verosimiliter ecallosum, parte antica intus medio papillosum, atropurpureum, nervis utrinque 7 extus prominentibus et margine albidum, inexplanatum c. 0.95 cm., cum calcaribus bene 1.3 cm. longum, explanatum c. 1.4 cm. latum, calcaribus 2 satis longis, divergentibus, anguste conicis, acutis, atropurpureis, c. 0.57 cm. longis. Gynostemium dorso convexum, albidum, totum c. 0.26 cm. longum, basi callo conspicuo atropurpureo labello adnatum. Anthera gynostemium continua, longitudinaliter conduplicata, connectivo carinato apice in apiculum obtusum producto, apice utrinque rotundata, purpurea, gynostemium aequans. Stigma concavum, margine elevatum et atropurpureum. Ovarium curvatum, valde 6sulcatum, pallide virescens, c.0.3 cm. longum.

Java: Batavia, Buitenzorg, auf dem Salak, Goenoeng Gadjah, in 1500 m ü d M, im Walde; 1 Ex. (R C. BAKHUIZEN VAN DEN BRINK JR. n. 542, bl. im November 1920).

Die Art ist vor allen andern bisher bekannten javanischen Spezies ausgezeichnet durch das aus schmalem Grunde stark keilig verbreiterte unpaare Sepalum. Die Färbung der Blüte ist dunkelweinrot mit wenig auffallender, weisslicher Aderung.

Leider war die einzige Blüte ziemlich beschädigt, indem der vordere Teil der paarigen Sepalen und der Lippe fehlte.

Corysanthes vinosa J. J. S.

Knollen kugelig, weisslich, 0.4--0.45 cm im Durchmesser. Unterirdischer Stengel lang behaart, 1.3--1.8 cm lang. Oberirdischer Stengel mit 2 dicht beisammenstehenden, von den Blatträndern herablaufenden Längsrippen, blassgrünlich, c. 2—2.75 cm lang, mit einer röhrigen, lang weichspitzigen Scheide am Grunde. Blatt tief herzförmig, spitz, mit einer langen Weichspitze, die Fusslappen schief abgerundet, von einem schmalen Sinus getrennt, beiderseits der oben gegefurchten, unten gekielten Mittelrippe mit wenigen unregelmässigen, anastomosierenden Seitennerven, matt dunkelgrün, unten glänzend, c. 1.5--1.7 cm, mit den Fusslappen 2.2--2.45 cm lang, 1.5--2 cm breit. Braktee aufrecht, linear, lang fadenförmig zugespitzt, rinnig, blassgrün, 1.35 cm lang. Blüte aufrecht, mittelgross. Unpaares Sepalum aufrecht, stark eingebogen, die Lippe überdeckend, konkav, spatelig, aus linearem Nagel in eine breit keilige, am vorderen Rande breit abgerundete und klein ausgefressene Platte verbreitert, aussen gekielt, 3nervig, die äusseren Nerven nach oben hin verzweigt, die Nerven alle aussen vorragend, aussen warzig, besonders auf den Nerven, dunkelweinrot mit weisslichen Rändern, Nerven und Punkten, ausgespreizt c. 2.1 cm lang, der Nagel 1 cm lang, 0.25 cm breit, die Platte 1.3 cm breit. Paarige Sepalen und Petalen fadenförmig, verlängert, papillös, der untere Teil weisslich, der obere Teil weinrot, die Petalen c. 3.4 cm lang. Lippe aufrecht, stark zurückgekrümmt, tutenförmig eingerollt, der untere Teil röhrig mit einander überdeckenden Rändern, der offene vordere Teil klein papillös, ausgefressen, wahrscheinlich ohne Callus, der vordere Teil innen in der Mitte papillös, dunkelweinrot, die beiden Hälften mit 7 aussen etwas vorragenden, weisslichen Längsnerven, c. 0.95 cm, mit den Spornen 1.3 cm lang, ausgespreizt 1.4 cm breit; Sporne 2, ziemlich lang, dünn kegelig, spitz, dunkelweinrot, 0.57 cm lang. Säule weisslich, 0.26 cm lang, am Grunde mit einem der Lippe angewachsenen Callus. Anthere aufrecht, der Länge nach zusammengelegt, mit gekieltem, an der Spitze in ein stumpfes Spitzchen ausgehendem Konnektiv, purpurn. Narbe mit erhabenem, dunkelpurpurnem Rande. Ovarium gekrümmt, 6furchig, blassgrünlich, 0.3 cm lang.

Nervilia punctata SCHLTR. in ENGL. Bot. Jahrb. XLV (1911), 402.-- *Pogonia punctata* Bl. Mus. Bot. Lugd. Bat. I (1849), 32; etc.

* var. **succedanea** J. J. S. n. var.

Tuber oblique depresso-globosum, albidum, c. 1.5 cm. longum, 0.2 cm. latum, radicibus brevibus patentissimis pilosis ad c. 0.9 cm. longis. Caulis hypogaeus teres, albus, verrucis pilosis donatus, c. 3 cm. longus, initio succedanee 2--3 inflorescentias deinde folium unicum et e parte foliifera stolonem elongatum album superne incrassatum fasciculis pilorum et vaginis teneris donatum c. 12 cm. longum gignens. Folium reniforme, 7angulatum, basi altius cordatum, lobis basilaribus rotundatis sinu acuto sejunctis, viride, c. 4 cm., cum lobis basilaribus 5.5 cm. longum, 5,85 cm. latum; petiolus canaliculatus, 7angulatus, viridis, costis sordide purpureus, c, 2.1 cm. longus. Inflorescentiae 1florae, pedunculo dilute viridi, purpureo-punctato, c. 6.8 cm. longo, vaginulis 2 majusculis tubulosis angulatis purpureo-punctatis ad c. 3.2 cm. longis donato, internodio ultimo sub fructu elongato, ad c. 13 cm. longo. Bractea erecta, pedicellum amplectens, oblongo-triangula, 2dentata (an semper?), concava, viridis, longitudinaliter interrupte purpureo-striolata, c. 0.6 cm. longa. Flos nutans, subhorizontalis, mediocris, leviter suaveolens, sepalis petalisque pallide viridibus, seriatim purpureo-punctatis. Sepalum dorsale lanceolatum, acutiusculum, concavum, c. 1.95 cm. longum, 0.45 cm. latum. Sepala lateralia suboblique lanceolata, acuta, concava, c. 1.85 cm. longa, 0.35 cm, lata. Petala lanceolata, acuta, leviter concava, c. 1.65 cm. longa, 0.3 cm. lata. Labellum 3lobum, lobis lateralibus incurvis gynostemium arcte amplectens et supra basin paulo constrictum, intus costis 2 longitudinalibus parallelis basi inconspicuis praesertim inter lobos laterales puberulis in lobo medio in costam longitudinalem convexam apicem attingentem confluentibus, subtus longitudinaliter sulcatum, explanatum c. 1.6 cm., usque ad apicem loborum lateralium 0.75 cm. longum, ad lobos laterales 0.63 cm. latum; lobi laterales gynostemium vix superantes, hypochylium subquadrangulum formantes, albi, nonnullis maculis pallidissime purpureis notati, apice libero breviusculo, porrecto, oblique triangulo, acutiusculo, fascia longitudinali dilute viridi inter lobos laterales; lobus intermedius porrectus, apice vix recurvulus, marginibus lateralibus superne incurvulis, cuneato-obovatus, obtusissimus, minutissime papilloso-ciliolatus, albus, laete purpureo-maculatus, c. 0.95 cm. longus, 0.575 cm. latus. Gynostemium clavatum, leviter undatum, subtus infra stigma puberulum, album, basi leviter virescenti-suffusum, apice parce pallide purpuree maculatum, c. 0.775 cm. longum, clinandrio alte excavato, filamento subulato. Anthera magna, oblique subcubica, alba, c. 0.225 cm. lata. Pollinia angusta, dilute flava. Stigma margine inferiore rotundatum. Ovarium obconicum, 6sulcatum, viride, sordide purpureo-punctatum, gynostemio crassius, c. 0.5 cm. longum; pedicellus tenuis, c 0.25 cm. longus. Capsula nutans, flore marcido coronata, rimis 6 in valvas basi apiceque connatas dehiscens, c.1.5 cm. longa.

Java: Priangan, Bandjar. (C. A. BACKER, leb. Pfl. kult. in Hort. J. J. SMITH, Mai 1911).

Diese Pflanze habe ich vorläufig als eine Varietät der *N. punctata* SCHLTR. beschrieben. Sie unterscheidet sich von der auf dem ursprünglichen Fundort bis jetzt wenigstens nicht blühend wiedergefundenen BLUME-schen Art nach den Figuren durch den verkehrt eirunden, sehr stumpfen Mittellappen und das viel kürzer gestielte Blatt.

Auch erwähnt BLUME nicht, dass seine Art nach einander mehrere Blütenstände hervorbringt. In dieser Hinsicht stimmt die hier beschriebene Pflanze überein mit der papuanischen *N. acuminata* (J. J. S.) SCHLTR.

Von Dr. R. SCHLECHTER wurde in ENGL. Bot. Jahrb. XLV (1911), 388, die Sektion *Nervilia* in Übereinstimmung mit PFITZER von *Pogonia* JUSS. abgetrennt und als selbständige Gattung hergestellt.

Die javanischen Arten sollen also heissen:

Nervilia crispata (BL.) SCHLTR.
Nervilia punctata (BL.) SCHLTR.
Nervilia discolor (BL.) SCHLTR.
Nervilia discolor SCHLTR. var. **picta** J. J. S.
Nervilia concolor (BL.) SCHLTR.
Nervilia Aragoana GAUD.--*Pogonia gracilis* BL
Nervilia campestris (J. J. S.) SCHLTR.

* **Nervilia Aragoana** GAUD. in FREYC. Voy. Bot. (1826), 422, t. 35.— *Pogonia flabelliformis* LNDL. in WALL. Cat. (1828) n. 7400; Gen. et sp. Orch. (1840), 415; MIQ. Fl. Ind. Bat. III (1855), 715; J. J. S. in Fl. Buit. VI, Orch. (1905), 57; Atlas fig. XXXVI.— *P. Nervilia* BL. Mus. Bot. Lugd. Bat. I (1849), 32; Fl. Javae Orch. (1858), 130, t. 36.— *P. gracilis* BL. l. c. 129, t. 57; MIQ. l. c. 716; J. J. S. l. c. 58.

Tuber oblique globosus, saepe plus minusve compressus, paucinodis, albidus, c. 1.7 et 2.4—2.7 cm. diam., radicibus patentissimis, brevibus, pilosis, c. 1.75 cm. longis. Caulis hypogaeus verticalis, pilosus, albidus, squamatus, c. 1.75—3.75 cm. longus, radicibus brevibus patentissimis pilosis ad c. 0.75 cm. longis, post florescentiam folium singulum gignens, e nodis et ex axilla folii stolones elongatos pilosos squamis donatos 12.5 cm. et plus longos emittens. Folium longe petiolatum, reniforme, apice breviter triangulo-acuminatum, basi alte cordatum, lobis basilaribus inexplanatis subparallelis vel plus minusvs divergentibus latis rotundatis, ima basi marginibus incurvis et in petiolum cuneato-contractum, margine plus minusve repando-sinuatam, obtusangule plicatum, nervis c. 12—16 curvatis supra prominentibus cum nervis 13—17 tenuioribus subtus prominentibus alternantibus, herbaceum, nitidule viride, subtus pallidius et basi in nervis purpureo-suffusum, initio saepissime fascia transversa semiorbiculari macularum irregularium interdum parvarum vel omnino deficientium atroviolacearum deinde evanescentium notatum, c. 6.5--10 cm. longum, 8.7--15 cm. latum; petiolus teres, angulatus, antice anguste superne altius canaliculatus, violaceus, plus minusve viridi-suffusus, c. 7--19 cm. longus, 0.55---0.625 cm. diam., vaginula initio ad basin. Inflorescentia erecta, laxe pluriflora, pedunculo angulato-costato, succoso, dilute viridi, praesertim inferne purpureo-suffuso, c. 12---

20 cm. longo, inferne vaginulis c. 3 tubulosis superne vix inflatis suprema excepta obtusis donato, rachide angulata, sulcata, dilute viridi, interdum plus minusve purpureo-suffusa, c. 4--10 cm. longa. Bracteae reflexae, lanceolatae, subacutae, concavae, dilute virides, nervis 3 purpureis, apice interdum plus minusve purpureo-maculatae, c. 1.4--2.2 cm. longae. Flores c. 4--10, quaquaversi, plus minusve nutantes, paulum aperti, sepalis petalisque dilute viridibus. Sepalum dorsale lineari-lanceolatum, acute acuminatum, plus minusve irregulariter marginatum, concavum, nervis 3 dorso prominentibus, c. 1.4--1.5 cm. longum, 0.25--0.3 cm. latum. Sepala lateralia oblique lineari-lanceolata, acute acuminata, plus minusve irregulariter marginata, angulato concava, 3- vel subtrinervia, praesertim costa media dorso prominente, c. 1.4--1.5 cm. longa, 0.3 cm. lata. Petala oblique lineari-lanceolata, subobtusa apiculataque vel acuta, plus minusve inregulariter marginata, leviter concava, nervo 1 dorso prominente, saepe nervo 1 brevi utrinque addito, c. 1.23--1.35 cm. longa, 0.2--0.26 cm. lata. Labellum cum ovario angulum obtusum faciens, sursum curvum, leviter undatum, 3lobum, marginibus incurvis supra basin contiguis tubulosum, gynostemium includens, 3nervium, nervis exterioribus ramosis, omnibus intus prominentibus, intus praesertim in nervis albo-villosum, pallide virescens vel fascia mediana alba, nervis in lobis dilute viridibus, in lobis lateralibus partim dilute violaceis vel violaceis, explanatum e basi contracta ambitu obovatum, c. 1.3 cm., usque ad apicem loborum lateralium 1--1.1 cm. longum, ad lobos laterales 0.76--0.95 cm. latum; lobi laterales erecti, porrecti, gynostemium superantes, oblique trianguli, subacuti vel bene acuminati, concavi, apice convexi; lobus intermedius porrectus, concavus, semiellipticus, obtusus vel transverse ovali-quadrangulus, apice obtuse productus et saepe retusus, plus minusve irregulariter marginatus, c. 0.33--0.36 cm. longus, 0.4--0.5 cm. latus. Gynostemium sursum curvulum, leviter sigmoideum, clavatum, glabrum, album vel pallide virescens, c. 0.7--0.75 cm. longum, clinandrio alte excavato, margine trilobo, apice incurvo, gibboso-convexo, auriculis late rotundatis, extus convexis. Anthera majuscula, cucullata, antice visa subquadrangula, apice angustata et in lobulum brevem truncatum producta, basi canalicula lata subretusa, alba vel albida, margine apice excepto purpurea, c. 0.16 cm. lata. Stigma obverse triangulum. Ovarium obconicum, acute trigonum, 6sulcatum, lateribus convexum, viride, c. 0.4 cm. longum; pedicellus tenuis, 6costatus, dilute viridis, c. 0.4 cm. longus. Fructus nutans, ellipsoideus, trigonus, 6costatus, apice obtusus et diu flore coronatus, basi abrupte in pedicellum contractus, lateribus subovalibus, praesertim facie inferiore obtusangule costatus, nitidule viridis, c. 1.1 cm longus, 0.75 cm. diam.

Java: Batavia, Buitenzorg. (OTTENS, leb. Pfl.). Tjiampea, Goenoeng Tjibodas, auf Kalkfelsen. (R. C. BAKHUIZEN VAN DEN BRINK, im Januar 1919, mit jungen Blättern). Auf dem Salak am Tjiapoes. (Sundanesischer Pflanzensucher, bl. im September 1912).

Priangan, Tjibeber, Tjidadap, Tjitjoeroeg in c. 1000 m ü.d.M., nicht selten. (R. C. BAKHUIZEN VAN DEN BRINK n. 788, im Januar 1916, steriel). Ebenda,

Tjisokan in c. 750 m ü. d. M., im Walde, stellenweise viel. (R. C. BAKHUIZEN VAN DEN BRINK n. 1066, bl. im Oktober 1916). Ebenda, Goenoeng Beser, in 1000—1200 m ü. d. M. (R. C. BAKHUIZEN VAN DEN BRINK). Ebenda, Goenoeng Toegoe bei Waroeng Blitoeng in c. 900 m ü. d. M. (W. F. WINCKEL, bl. im Oktober 1918, auch kult. in Hort. J. J. SMITH). Zwischen Tjiletoe und Tjikepoe in 150 m ü. d. M., in einem Bambuwalde, an zwei Stellen in grosser Menge. (C. A. BACKER n. 17616, im November 1914).

Tegal, Kedoengdjati, südwestlich von Pamalang, in 30 – 100 m ü. d. M., im Djatiwalde auf Mergelboden, wenige zerstreute Exemplare. (J. G. B. BEUMÉE n. 3679 und 3749, im Januari 1919, steriel).

Pekalongan, bei Soebah in c. 175 m ü. d. M., im Djatiwalde; an einer Stelle mehrere Exemplare. (J. G. B. BEUMÉE n. 3795, im Januar 1919, steriel).

Semarang, Kedoengdjati, im Djatiwalde Tempoeran. (W. M. DOCTERS VAN LEEUWEN n. 355, bl. im September 1911; n 359. im Dezember 1911, steriel; auch kult.) Ebenda, bei Manggar. (M. MANGOENKROMODIREDJO, bl. im Oktober 1896, KDS. n. 25332 β).

Rembang, Tjabak, in 150 m ü. d. M. im Djatiwalde. (S. H. KOORDERS n. 49819, im Februar 1914, steriel). Randoeblatoeng bei Getas in 100 – 150 m ü. d. M., auf Lehmmergel im Djatiwalde. (G. BLOKHUIS, im September 1917).

Madioen. (J. G. B. BEUMÉE, leb. Pfl. kult. in Hort. J. J. SMITH).

Kediri, Gadoeng-Pare in 150 m ü. d. M., im Walde. (S. H. KOORDERS n. 41415 β, im Mai 1915, steriel).

Soerabaja, bei Koepang. (C. E. B. BREMEKAMP, im Oktober 1917). Im Djatiwalde Krandang, auf Mergelboden, viel aber zerstreut. (L. G. DEN BERGER n. 250, im Oktober 1917).

Besoeki, Goenoeng Sadeng bei Poeger in 50 m ü. d. M., auf bewaldetem Kalkboden, 1 Ex. (C. A. BACKER n. 17936, bl. im Dezember 1914). Tjoeramanis. (M. JOEDO, bl. im November 1899, KDS. n. 38394 β).

Geogr. Verbr. Ostindien, Malaka, Sumatra, Krakatau, Philippinen, Soela-Inseln, Molukken, Neu-Guinea, Samoa.

Als ich 1905 ein Übersicht der javanischen Orchideen gab, war mir noch kein javanisches Exemplar dieser Orchidee in die Hände gekommen. Seitdem ist sie mehrmals gesammelt worden und scheint besonders in Djatiwäldern nicht selten zu sein.

Die Art benehmt sich genau, wie ich es für *N. Winckelii* J. J. S. beschrieben habe. (Bull. Jard. Bot. Buit. 2e sér. n. XXVI, 1918, 3). Die ersten, nach der Ruheperiode gebildeten Ausläufer bilden also keine wirklichen Knollen an ihrem Ende, sondern treiben sofort ein Blatt. Erst die an diesen neuen Trieben entwickelten Ausläufer schwellen an ihrer Spitze zu richtigen Knollen an.

Die jungen Blätter zeigen meistens einen halben Kreis unregelmässiger dunkelvioletter Flecken, die aber bisweilen nur klein sind oder auch völlig fehlen. Bei älteren Blättern verschwinden diese Flecken stets.

Die Blüten sind ziemlich variabel in der Grösse und in der Form der Lippe.

Ich habe keine Exemplare von Gegenden ausserhalb des Archipels gesehen. Beschreibung nach javanischen Exemplaren.

CRYPTOSTYLIS R. BR.

Wie bei so vielen anderen Gattungen hat es sich auch hier bei einem genaueren Studium ergeben, dass eine bestimmte Art sich allmählich zu einer Sammelspezies ausgedehnt hat.

Cryptostylis arachnites HASSK. wurde zuerst nach javanischem Material beschrieben, ist dann aber später für Britisch-Indien, Ceylon, die Malaiische Halbinsel, Borneo, die Philippinen und Neu-Guinea angegeben worden.

Ich habe kein Material der als *C. arachnites* bestimmten Pflanzen von Britisch-Indien, Ceylon, der Malaiischen Halbinsel und Borneo gesehen, vermute jedoch, dass hier noch manches aufzuklären sein wird. RIDLEY giebt an (Mat. Fl. Mal. Penins. I (1907), 225), dass die Pflanze sehr variabel ist, nachdem er früher (in Journ. Linn. Soc. Bot. XXXII (1896), 407) darauf aufmerksam gemacht hatte, dass zwei sehr verschieden aussehende Formen vorkommen. Für Java habe ich eine ähnliche Bemerkung gemacht (in Fl. Buit. VI, Orch. (1905), 60).

Für Neu-Guinea ist die Art zu streichen; die in Nova Guinea als *C. arachnites* aufgeführten Pflanzen werde ich demnächst als neu beschreiben.

Von den Philippinen liegen mir nur ELMER n. 11845 und Bureau of Science n. 14442 und n. 20462 vor. Die beiden ersten Nummern ähneln in der Blütenform *C. arachnites* HASSK. sehr; das Material ist aber nicht gut genug für Untersuchung. Die Nummer 20462 gehört sicher nicht zu *C. arachnites*.

Als ich zur Gelegenheit der Bestimmung einiges von Sumatra stammenden *Cryptostylis*-Materials das gesammte Buitenzorger Material der Gattung einer Revision unterwarf, ergab sich die überraschende Tatsache, dass in Java, ausser der zweifelhaften *C. filiformis* BL., vier gut geschiedene Arten vorkommen.

C. arachnites HASSK. ist auf den Bergen von Java keine seltene Orchidee und wurde wiederholt gesammelt. Auch von Bali und Sumatra liegt Material vor. Die Art is leicht kenntlich an dem an der Spitze eingebogenen, im oberen Teile mit mehr oder weniger in Querreihen gestellten dunklen Fleckchen gezeichneten Labellum und der stumpfen Anthere.

Die zweite Art habe ich hierunter als *C. javanica* J. J. S. aufgeführt. Es ist diese Art, die ich früher unglücklicherweise als *C. arachnites* beschrieben und abgebildet habe. Sie ist vor *C. arachnites* HASSK. ausgezeichnet durch die an der Spitze nicht eingebogene, sondern völlig konvexe Lippe mit mehr oder weniger in Längsreihen und am Rande gestellten dunklen Fleckchen und die in ein Schnäbelchen zugespitzte Anthere. Ausserdem sind die Blüten grösser und ist der Blütenstand lockerer. In West-Java ist die Art nicht seltener als *C. arachnites;* von Ost-Java liegt dagegen noch kein Material vor und auch ausserhalb Java wurde die Art noch nicht angetroffen.

Die dritte Art, *C. conspicua* J. J. S., hat etwas grössere Blüten, besonders eine breitere Lippe als die beiden anderen Spezies, wiewohl einige Formen der *C. javanica* ihr doch sehr nahe kommen, und eine nicht gefleckte, sondern mit einem dunklen Längsbande gezeichnete Lippe. Scharf getrennt ist sie gegenüber *C. arachnites* und *C. javanica* durch die Aushöhlung am Grunde der Lippe, die bei den genannten Spezies von vorne gesehen kurz und dreieckig, bei *C. conspicua* viel länger und nahezu linear ist. Übrigens ist die Lippe konvex wie bei *C. javanica*, die Anthere stumpf und der Blütenstand locker. Die Pflanze scheint auf Java sehr selten zu sein'; sie wurde bis jetzt nur am Nordhang des Goenoeng Boerangrang gefunden. Dagegen wurde eine Varietät in zahlreichen Exemplaren in den Padangsche Bovenlanden in Sumatra gesammelt.

Schliesslich wurde neulich von Herrn R. C. BAKHUIZEN VAN DEN BRINK auf dem Salak bei Buitenzorg eine vierte Art gefunden, die ich der schmalen, gegen die Spitze allmählich verschmälerten Lippe wegen *C. acutata* nannte. Sie ist ausserdem vor den anderen javanischen Arten dadurch ausgezeichnet, dass die paarigen Sepalen nicht wagerecht abstehen, sondern mit einander einen geraden oder fast geraden Winkel darstellen. Die Aushöhlung am Grunde der Lippe ist nur kurz. Die Art wurde von Herrn H. A. B. BÜNNEMEYER auch in Sumatra gesammelt.

Schlüssel der javanischen Arten.

1. Lippe an der Spitze deutlich einwärts gebogen, besonders auch bei alten Blüten. 2
   Lippe an der Spitze nicht oder kaum einwärts gebogen 3
2. Lippe gefleckt. Blätter etwas dunkler netzadrig. . . . *C. arachnites* HASSK.
   Lippe nicht gefleckt. Blätter nicht dunkler netzadrig. . . . *C. filiformis* BL.
3. Lippe an der Spitze kaum etwas einwärts gebogen, stark verschmälert, gefleckt. Paarige Sepalen schräg aufwärts, einen rechten oder fast rechten Winkel bildend. . . . . *C. acutata* J. J. S.
   Lippe nicht einwärts gebogen, nicht stark verschmälert. Paarige Sepalen weit abstehend 4
4. Lippe gefleckt, mit kurz dreieckiger Aushöhlung am Grunde. Anthere geschnäbelt. . . . . *C. javanica* J. J. S.
   Lippe nicht gefleckt; Aushöhlung am Grunde bis unterhalb der Mitte reichend. Anthere nicht geschnäbelt . . . . *C. conspicua* J. J. S.

* **Cryptostylis arachnites** HASSK. (non J. J. S.) Cat. Bog. (1844), 48; BLUME Fl. Jav. Orch. (1858), 112, t. 45, fig. 2.— *Zosterostylis arachnites* BL. Bydr. (1825), 419; Tab. fig. 32; Lndl. Gen. et. sp. Orch. (1840), 446; MIQ. Fl. Ind. Bat. III (1855), 721.

Rhizoma verticale, breve, carnosum, radicibus crassis, villosis. Folia pauca, radicalia, erecta, petiolata, oblique elliptica, saepe plus minusve ovata, acute aciminata, basi breviter acute acuminata, costa media supra canaliculata subtus valde prominente, curvinervia, venis transversis obliquis reticulato-venosa, herbacea, utrinque nitide viridia, subtus pallidiora, c. 12,5—15 cm. longa, 5—6.5 cm lata; petiolus basi tereti excepta antice canaliculatus, in folio summo ad basin inflorescentiae usque ad basin canaliculatus, di-

lute viridis, plus minusve interdum densissime sordide violaceo-marmoratus, lc. 4.75--10 cm. longus, initio vaginis mox exarescentibus ad c. 6.5 cm. longis obtectus. Inflorescentia erecta, laxius multiflora, pedunculo tereti, pallido vel dilute viridi, plus minusve dense longitudinaliter sordide atroviolaceo-punctato ad fusco-purpureo viridi-punctato, c. 23--30 cm. longo, vaginulis c. 2--3 tubulosis longe apiculatis dilute viridibus plus minusve longitudinaliter violaceo-punctatis ad c. 3.25--4 5 cm. longis donato, rachide sulcis 2 a pulvinis decurrentibus instructa, colore pedunculi, c. 13.5--17.5 cm. longa. Bracteae ovario adpressae, ovato-triangulae, longe subulato-acuminatae, dilute virides, longitudinaliter sordide violacee striato-punctatae, ad c. 1.5 cm. longae. Flores pulvinis inserti, erecti, mediocres, c. 2.8 cm. lati et longi, sepalis marginibus involutis subulatis, pallide virescentibus, sordide purpureo-fuscescenti-marmorato-striolatis. Sepalum dorsale explanatum lineare, acutum, 3nervium, c. 1.3--1.45 cm. longum, fere 0.3 cm. latum. Sepala lateralia intermedio similia, apiculata, c. 1.4--1.5 cm. longa, fere 0.3 cm. lata. Petala multo minora, divergentia, explanata linearia, apiculata superne minute papilloso-ciliolata, 1nervia, purpurascentia, margine pallida, c. 0.7--0.95 cm. longa, 0.16 cm. lata Labellum erectum, ambitu oblongum, sigmoideum, supra saccum recurvum, convexum, apice hamato-incurvum et marginibus incurvis crasse subulatum, basi medio breviter cucullato-excavatum, cuculla a latere compressa, dorso rotundata, antice visa triangula, c. $^1/_3$ totius longitudinis labelli occupante, semipellucida, dilute flava, dorso stria fuscescenti notata, cuculla excepta antice et dorso in apice incurvo velutino-puberulum, dilute flavescenti-purpurascens, superne obscurius et maculis rotundis plus minusve transverse seriatis cum margine labelli atropurpureis ornatum, inexplanatum c. 1.5--1.65 cm. longum, 0.7 cm. latum, subexplanatum ambitu oblongo-quinquangulare, acutum, basi brevissime biauriculatum, 1.7 cm. longum. Gynostemium brevissimum, recurvum, dorso convexum, flavescenti album, clinandrio bilobo, lobis late subrotundatis, extus convexis, intus concavis, verruculosis, auriculis inferius, triangulo-dentiformibus. Anthera cucullata, ovata, obtusa, connectivo convexo-incrassato, papilloso, flavescenti-alba, bene 0.175 cm. longa. Pollinia oblique oblonga, flava, c. 0.2 cm longa. Rostellum porrectum, anguste bidentatum, dentibus sinu lato sejunctis. Stigma prominens, cum rostello suborbiculare. Ovarium erectum, curvulum, alte 6sulcatum, dilute viride, in costis confluenter sordide violaceo-maculatum, c. 1--1.2 cm. longum, pedicello brevissimo, sub fructu plus minusve elongato

Java: Batavia, Buitenzorg, Goenoeng Boetik Boeligir, in 1000 m ü. d. M., im Urwalde. (C. A. BACKER n. 6135, bl. im Dezember 1912). Auf dem Salak bei Tjigombong in c. 1200 m ü d. M., im Urwalde. (J. J. SMITH. bl. im Dezember 1899). Salak, oberhalb Pasir Pogor in 1500 m ü. d. M., im Urwalde. (C. A. BACKER n. 9229, bl. im September 1913). Ebenda, Goenoeng Gadjah in 1000 m ü. d. M., im Walde, viel. (R. C. BAKHUIZEN VAN DEN BRINK n. 4021, bl. im August 1920). Krawang, auf dem Boe-

rangrang am Nordhang, in 1200 m ü. d. M., im feuchten Walde, einige Exemplare. (C. A. Backer n. 14032, bl. im Juni 1914). Ebenda, Goenoeng Limoes in 1200 m ü. d. M., viel. (R. C. Bakhuizen van den Brink n. 4621, bl. im Juli 1920).

Priangan, Tjiandjoer, auf dem Gede, am Wege zu den warmen Quellen, in c. 1600 m ü. d. M (J. G. Boerlage, 1899). Ebenda, am Südhang, in 1800 m ü. d. M, im Urwalde, einige Exemplare, (C. A. Backer n. 14629, bl. im Juli 1914). Ebenda, Goenoeng Tjiparaj, im 1250--1600 m ü. d. M, im Urwalde, zerstreut aber nicht selten. (C. A. Backer n. 15005, bl. im Juli 1914). Auf den Gegerbintang, in 1800--2000 m ü. d. M., im Urwalde. (W. Burck, bl. im Juli 1891; J. J. Smith, bl. im Juni 1906; Tirtoatmodjo, Kds, n. 41152 *β*, bl. im November 1912; C. A. Backer n. 13704, bl. im Mai 1914; L. G. den Berger, bl. im September 1918). Bandoeng, auf Goenoeng Masigit, in 1600--1800 m ü. d. M., im Urwalde. sporadisch. (C A. Backer n. 12399 bl. im März 1914) Garoet. (J. W. A. Ader, n. 80). Taloen bei Pengalengan in c. 1800 m. ü. d. M., im Urwalde (W. M. Docters van Leeuwen n. 2342, bl. im Mai 1916). Auf dem Goenoeng Mandalagiri, in 1650 m ü. d. M, einige Exemplare.(H. J. Lam n. 3, bl. im März 1920). Ebenda, Goenoeng Djaja, auf der Südostspitze, in 1460 m ü. d. M., im Urwalde, ziemlich viel. (H. J. Lam n. 148, bl. im März 1920).

Pekalongan, Abt. Pekalongan, Goenoeng Praboto, 1500 m. ü. d. M., im Walde, einige Exemplare. (C. A. Backer n. 15997, bl. im September 1914).

Semarang, auf Goenoeng Andoeng, in 1500--1700 m. ü. d.M., im dunklen Urwalde, sehr allgemein. (W. M. Docters van Leeuwen n. 284, meistens in Frucht im Oktober 1911).

Kediri, auf dem Wilis in 1250--1500 m. ü. d.M, im alten sekundären Walde. (C. A. Backer n. 11372, bl. im Februar 1914).

Soerabaja, Modjokerto, auf Goenoeng Andjasmoro, in 1500 m. ü. d.M. (S. de Meyier n. 33, bl. im Oktober 1917).

Bali: Goenoeng Batoe Kaoe, in 1925 m. ü. d M. (Exp. R. Maier, Sarip n. 421, bl. im Oktober 1918).

Sumatra: Westküste, Goenoeng Malintang, in 2000 m. ü. d. M. im Walde. (H. A. B. Bünnemeyer n. 3934, bl, im Juli 1918).

Palembang, Goenoeng Dempoe, in 1400 m. ü. d. M. (Expedition E. Jacobson, Ajoeb n. 433, bl. im August 1916).

Häufig wird Endlicher als Autor dieser Art angenommen. Endlicher hat zwar *Zosterostylis* Bl. mit *Cryptostylis* vereinigt, jedoch die Arten nicht in diese Gattung übergetragen. Hasskarl war der erste, der die Kombination *Cryptostylis arachnites* gemacht hat.

Die Art ist gegenüber *C. javanica* J. J. S., *C. conspicua* J. J. S. und *C. acutata* J. J. S noch ausgezeichnet durch die violett gefärbten Sepalen und Petalen, die bei den anderen Arten hellgrün sind.

Beschreibung nach mehreren lebenden Exemplaren.

* **Cryptostylis acutata** J. J. S. n. sp.

Rhizoma breve, carnosum, radicibus crassis. Folia erecta, oblique ovata, acute acuminata, basi oblique rotundata vel obtusa, curvinervia, costa media supra canaliculata subtus crasse carinata, nervis 2 majoribus supra leviter sulcatis subtus prominulis utrinque, venis transversis laxe reticulato-venosa, supra nitide viridia, venis paulo obscurioribus, subtus nitidula et pallidiora, c. 12.5 --14.5 cm. longa, 5.75--7.5 cm. lata; petiolus subteres, antice canaliculatus, dilute viridis, sordide violaceo-punctatus non maculatus, c. 6.5--9.5 cm. longus. Inflorescentia stricta, laxe multiflora, pedunculo tereti, dilute viridi, longitudinaliter sordide violacee striolato-punctato, c. 25 cm. longo, basi nonnullis vaginulis approximatis tubulosis acuminatis mox exarescentibus, ceterum vaginulis 2 viridibus basi tantum punctatis ad c. 3.5--4.75 cm. longis inferiore tantum tubulosa donato, rachide quaquaverse flexuosa, 2sulcata, colore pedunculi, 15 cm. superante. Bracteae ovario adpressae, ovatae, longe acutissime acuminatae, concavae, 5nerviae, dilute virides, c. 2 cm. longae, 0.8 cm. latae. Flores erecti, c. 3.25 cm. longi et lati, sepalis petalisque marginibus involutis tubuloso-filiformibus, dilute viridibus. Sepalum dorsale deorsum spectans, cum ovario angulum acutum faciens, explanatum lineare, acutum, apiculatum, 3nervium, c. 1.8 cm. longum, 0.3 cm latum. Sepala lateralia patentia, inter se angulum rectum vel subrectum cum sepalo dorsali angulos obtusos facientia, explanata linearia, apicem versus angustata, apiculata, 3nervia, c. 2 cm. longa, 0.34 cm. lata. Petala inter sepala patentia, explanata linearia, acuta, 3nervia, c. 1.1 cm. longa, 0.18 cm. lata. Labellum erectum, angustum, apice vix incurvulo levissime sigmoideum, antice visum oblongo-ovato-triangulum, basi breviter cucullatum, cuculla antice visa ambitu late triangula, apice contracta obtusa, dorso subangulato-rotundata, semipellucida, pallida, nervis dilute viridi, marginibus angustis convexum, supra cucullam convexum cum costa longitudinali convexa superne evanescente, apice leviter concavum dorso convexum cum sulco longitudinali, cuculla excepta purpuree velutino-puberulum, dimidio superiore pallidius cum maculis atropurpureis, c. 1.85 cm. longum, 0.6 cm. latum, explanatum triangulum, vix quinquangulare, apicem versus sensim angustatum, acutum, basi truncatum et utrinque inconspicue rotundato-auriculatum, c. 1.9 cm. longum, 1 cm. latum. Gynostemium brevissimum, recurvum, cum ovario angulum obtusum faciens, clinandiro utrinque 3lobulato, lobulo infimo (auricula) excepto verruculoso. Anthera cucullata, late ovata, papillosa connectivo in costam longitudinalem latam convexam incrassato, apice in rostrum breve incurvulum conicum producto, basi minute bilobulata (basi thecarum), flavescenti-alba, basi carneo-suffusa, c. 0.18 cm. longa. Pollinia 2, oblique oblonga, vix curvula, obtusa, extus convexa, dilute flava, cum glandula orbiculari c. 0.17 cm. longa. Rostellum porrectum, subquadrangulum, dentibus 2 subulatis, remotis. Stigma prominens, margine inferiore producto quadrangulo recurvo. Ovarium erectum, apice recurvulum, crassius cylindricum, 6sulcatum, viride, c. 1.8 cm longum.

Java: Buitenzorg, Salak, Goenoeng Gadjah in 1500 m ü. d. M. (R. C. Bakhuizen van den Brink n. 4029, bl. im August 1920).

Sumatra: Westküste, Goenoeng Malintang in 2000 m ü. d. M. (H. A. B. BÜNNEMEYER n. 3934 a, gemischt mit *C. arachinites* HASSK., bl. im Juli 1918). Ebenda, in 1900 m ü. d. M., im Walde. (H. A. B. BÜNNEMEYER n 4056, bl. im Juli 1918). Goenoeng Sago, in 1800 m ü. d. M., im Walde. (H. A. B. BÜNNEMEYER n 4356, bl. im August 1918).

Die sumatranischen Fundorte sind alle nur durch ein einziges Exemplar vertreten. Die einzige in Alkohol aufbewahrte Blüte zeigte eine mehr fünfeckige Lippe als die javanischen Exemplare.

Cryptostylis acutata J. J. S.

Rhizom kurz, mit dicken Wurzeln. Blätter schief eirund, spitz zugespitzt, mit schief abgerundeter oder stumpfer Basis, mit oben rinniger, unten gekielter Mittelrippe und beiderseits 2 oben schwach gefurchten, unten schwach vorragenden Nerven, locker netzadrig, glänzend grün mit etwas dunkleren Adern, unten schwach glänzend und heller, c. 12.5--14 cm lang, 5.75--7.5 cm breit; Stiel nahezu stielrund, vorn rinnig, hellgrün, schmutzig violett punktiert, nicht gefleckt, c. 6.5--9.5 cm lang. Blütenstand locker vielblütig; Pedunculus stielrund mit kleinen, schmutzig violetten Längsstrichelchen, c. 25 cm lang, mit einigen Schaftblättern; Rachis 2furchig, hin und her gebogen, gefärbt wie der Pedunculus, mehr als 15 cm lang. Brakteen anliegend, eirund, lang und sehr spitz zugespitzt, konkav, 5nervig, hellgrün, c. 2 cm lang. Blüten aufrecht, c. 3.25 cm lang und breit, die Sepalen und Petalen durch eingerollte Ränder röhrig fädlich, ausgespreizt linear mit einem Spitzchen 3nervig, hellgrün. Unpaares Sepalum c. 1.8 cm lang, c. 3 cm breit; paarige Sepalen unter einander einen rechten oder fast rechten Winkel, mit dem unpaaren Sepalum stumpfe Winkel darstellend, c. 2 cm. lang, 0.34 cm. breit Petalen 1.1 cm. lang, 0 18 cm. breit. Lippe aufrecht, schmal, durch die einwärts gebogene Spitze schwach Sförmig, von vorne gesehen länglich eirund dreieckig, an der Basis mit einer kurzen, dreieckigen, zusammengezogenen, durchscheinenden, blassen, mit hellgrünen Nerven durchzogenen Aushöhlung mit schmalen, konvexen Rändern, oberhalb der Aushöhlung konvex mit einer konvexen, nach oben verschwindenden Längsrippe, an der Spitze schwach konkav und aussen konvex, vorn ausser der Aushölung auf blassgelblichem Grunde purpurn sammthaarig, der obere Teil heller mit dunkelpurpurnen Flecken, c. 1.85 cm. lang, 0.6 cm. breit, ausgespreizt dreieckig, kaum etwas fünfeckig, gegen die Spitze allmählich verschmälert, spitz, an der Basis abgestutzt und schwach 2öhrig, c 1.9 cm lang, 1 cm breit. Säule sehr kurz, zurückgebogen, mit dem Ovarium einen stumpfen Winkel darstellend; Clinandrium beiderseits kurz 3lappig, ausser dem unteren Läppchen (Öhrchen) warzig. Anthere breit eirund, stumpf, papillös, das Konnektiv zu einer breiten, konvexen Längsrippe verdickt mit einem kurzen, eingebogenen Schnäbelchen, gelblich weiss, c.0 18 cm. lang. Pollinien länglich, kaum etwas gebogen, hellgelb. Rostellum mit 2 pfriemlichen Zähnen. Narbe mit erhabenem, zurückgebogenem Unterrande. Ovarium aufrecht, mit etwas ausgebogener Spitze, 6furchig, grün, c. 1.8 cm. lang.

* **Cryptostylis javanica** J. J. S. n. sp. — *C. arachnites* J. J. S. (non HASSK.) in Fl. Buit. VI, Orch. (1905), 59 (excl. syn.); Atlas Fig. XXXVII.

Rhizoma breve, verticale, radicibus crassis, villosis. Folia pauca, radicalia, erecta, petiolata, oblique elliptica vel plus minusve ovata, acute acuminata, basi breviter in petiolum contracta, costa media supra canaliculata subtus valde carinata, curvinervia, nervis majoribus supra leviter canaliculatis subtus vix prominulis c. 2--3 utrinque, venis transversis horizontalibus plerumque continuis reticulato-venosa, herbacea, nitidule viridia cum venis vix obscurioribus, subtus pallidiora, c. 14--20 cm. longa, 5 8--8.2 cm. lata; petiolus antice canaliculatus, dilute viridis, plus minusve dense sordide atroviolacee maculatus et punctatus, c. 8 -12 cm. longus, initio inferne vaginis obtectus. Inflorescentia erecta, elongata, laxe multiflora, pedunculo tereti, pallide viridi, plus minusve dense atroviolacee striato-punctato, c. 24--32 cm. longo, inferne 0.375--0,4 cm. diam., vaginulis c. 5 adpressis tubulosis acutis minus dense punctatis ad c. 3.5 cm. longis donato, rachide sulcis 2 a pulvinis decurrentibus instructa, colore pedunculi, ad c. 30 cm. longa. Bracteae ovario adpressae, concavae, ovato-oblongae, acute acuminatae ,basi latae, 5nerviae, pallide virides, sparse sordide purpureo-punctatae, c.1.8 cm. longae, 0.7 cm. latae. Flores pulvinis inserti, erecti, majusculi, c. 3.7 cm longi et lati, sepalis petalisque marginibus involutis subulatis, dilute viridibus. Sepalum dorsale deorsum spectans, explanatum lineare, apiculato-acuminatum, 3nervium, c. 1.5 --1 8 cm. longum, 0.25--0.3 cm. latum. Sepala lateralia intermedio similia, divaricata. Petala inter sepala patentia, multo minora, explanata linearia ad lanceolato-linearia, acute acuminata, 1nervia, c. 0 9--1.1 cm. longa, 0.15- 0.18 cm lata. Labellum erectum, ambitu plus minusve ovato-rhombeum, marginibus recurvis convexum, apice antice canaliculatum, supra cucullam recurvum, basi medio breviter cucullato-excavatum, cuculla paulo a latere compressa, dorso basi rotundata, antice visa triangula, semipellucide virescenti-flava, cuculla excepta antice velutinum, costa media et nervis sequentibus dorso sulcatis, ochrascens, inferne pilis fusco-purpurascens, superne maculis orbicularibus atrofusco-purpureis marginalibus et plus minusve longitudinaliter seriatis ornatum, 5nervium, explanatum totum c. 1.9 cm. longum, supra hypochylium transverse oblongum c. 0.45 cm. longum 0.9--1 cm. latum leviter constrictum, epichylio (lobo intermedio) ovato, acuto vel leviter acuminato, c. 1.45 cm. longo, 1--1.1 cm. lato. Gynostemium brevissimum, obtusangule recurvum, albidum, clinandrio lato, utrinque plus minusve crenato, dorso convexo, verruculoso, auriculis triangulis. Anthera cucullata, ovata, basi bilobula, connectivo convexo-incrassato, apice obtuse conico-producto, papilloso, pallide flavescens, c. 0.24 cm. longa. Pollinia 2, bipartita, oblique oblongo-pyriformia, flava, cum glandula orbiculari fusca. Rostellum porrectum, bidentatum. Stigma prominens, cum rostello subreniforme. Ovarium erectum, 6sulcatum, viride, c. 1.4-1.7 cm. longum, pedicello brevissimo.

Java: Banten, Hügel bei Pasaoeran, in 300 m ü. d. M., im Urwalde. (C. A. BACKER n. 7157, bl. im März 1914).

Batavia, Buitenzorg, bei der Stadt, in 260 m ü. d. M., in Bambusgebüsch. (J. J. SMITH). Goenoeng Batoe bei Tjianten, südwestlich von Buitenzorg, in 1000 m ü. d. M., im Urwalde. (C. A. BACKER n. 25830, bl. im August 1918). Goenoeng Karang Gantoengan, in 900--1000 m. ü. M., im Urwalde, ein Paar Exemplare. (C. A BACKER n. 6052 und 6273 bl. im Dezember 1912). Goenoeng Kendeng bei Nirmala, in 1300 m ü. d. M, im Urwalde, ein Paar Exemplare. (C. A. BACKER n. 10973, bl. im Dezember 1913). Nirmala, in 1350 m ü. d. M., im Urwalde. (C. A. BACKER n. 11148, bl. im Dezember 1913). Djasinga, Goenoeng Kinarima, in 650 m ü. d. M., im Walde, 1 Exemplar. (C. A. BACKER n. 9944, bl. im November 1913). Djasinga, Goenoeng Gede, auf dem Gipfel, in 1000 m ü. d. M, im Walde, 1 Exemplar. (C. A. BACKER n. 10251, bl. im November 1913). Goenoeng Handjawang in 700- 970 m ü. d. M. (C. A. BACKER n. 6052, bl. im Dezember 1912). Auf dem Salak. (Sundanesischer Pflanzensucher; W. M. DOCTERS VAN LEEUWEN, bl. im Juni 1918 und Juli 1920). Ebenda, oberhalb Pasir Pogor, 1200 m ü. d. M, auf einem Bergrücken, ein Paar Exemplare. (C. A. BACKER n. 9403, bl. im September 1913). Ebenda, Goenoeng Gadjah in 1000 m. ü. d. M., im Walde, viel. (R. C. BAKHUIZEN VAN DEN BRINK n. 4138, bl. im November 1920). Krawang, Wanajasa bei Poerwakarta in 800 m ü. d. M. im Walde, viel. (R. C. BAKHUIZEN VAN DEN BRINK, n. 4645 and 4742, bl. im Juli 1920). Ebenda am Nordhang, in 1600 m ü. d. M., im sekundären Walde, viele Exemplare. (C. A. BACKER n. 14175, bl im Juni 1914). Ebenda, Goenoeng Limoes, in 1250 m ü. d. M., im Walde, viel. (R. C. BAKHUIZEN VAN DEN BRINK n. 4395, bl. im Juli 1920).

Priangan, Soekaboemi, bei Tjipetir. (W. BURCK und P. DE MONCHY, ohne Datum). Pasawahan, zwischen Tjibadak und der Zandbai, in 550 m ü d. M, im Walde, einige Exemplare. (R. C. BAKHUIZEN VAN DEN BRINK n. 1705, bl. im August 1918). Plantage Tjigoea, in 1000 m ü. d. M., im Urwalde, mehrere Exemplare. (C. A. BACKER n. 15122, bl. im Juli 1914). Tjiandjoer, Goenoeng Sanggaboeana, nördlich von Tjiandjoer, in 900 m ü. d. M., im Urwalde, mehrere Exemplare. (C. A. BACKER n. 23785, bl. im März 1918) Tjibeber, Tjidadap, in 1000 m ü d. M., im Walde, viel. (R. C. BAKHUIZEN VAN DEN BRINK n. 3636, bl. im April 1916). Ebenda, Goenoeng Gombong bei Goenoeng Karang, in 1100 m. ü. d. M., im Walde, viel. (W. F. WINCKEL, bl. im Juni 1918). Ebenda, Tjadas Malang in 1000 m ü.d. M, im Walde, zerstreut. (R. C BAKHUIZEN VAN DEN BRINK n. 1308, bl. im September 1916). Ebenda, Pasir Loetoeng in 1000 m ü. d. M, im Walde, viel (R. C BAKHUIZEN VAN DEN BRINK n. 2943, bl. im März 1917). Ebenda, Tjoeroeg Djanggot, Tjitibo, in 900 m ü d M. (R. C. BAKHUIZEN VAN DEN BRINK n. 1229, bl. im Oktober 1916). Ebenda, Tjisokan, in 1000 m ü.d.M. (W.F. WINCKEL, bl. im September 1916). Garoet. (J. W. A. ADER n. 80, gemischt mit *C. arachnites* HASSK). Tasikmalaja, Pasir Walang, bei Nanggerang, in 1050 m ü.d.M., im Urwalde, viel. (C. A BACKER n. 8742, bl. im August 1913).

Pekalongan, Abt. Pekalongan, Goenoeng Groedo, in 1200 m ü. d. M, im Urwalde. (J. J SMITH, bl. im September 1899).

Banjoemas, Tjilatjap, auf Goenoeng Tjendana bei Madjenang in 700 m. ü.d.M., im Walde, zahlreich. (C. A. BACKER n. 18655, bl. im Januar 1915).

* **Cryptostylis conspicua** J. J. S. n. sp.

Rhizoma validum, breve, verticale, carnosum, radicibus crassis, villosis. Folia erecta, oblique oblongo-ovata, acute acuminata, basi brevissime in petiolum contracta, curvinervia, costa media supra canaliculata subtus valde prominente, nervis 2 majoribus supra sulcatis subtus prominulis utrinque, venis transversis horizontalibus vel marginem versus vix adscendentibus plerumque continuis laxe reticulato-venosa, nitide atroviridia, venis vix obscurioribus, subtus pallida, nitidula, herbacea, c. 14.5—19.5 cm. longa, 6—8.2 cm. lata; petiolus teres, antice canaliculatus, nitide atroviolaceus, c. 12.5—18.5 cm. longus. Inflorescentia erecta, valida, laxe multiflora, pedunculo tereti, nitide atroviolaceo, inconspicue viridule puncticulato, c. 35—41 cm. longo, inferne c. 0.6 cm. diam., vaginulis c. 6 tubulosis acutis inferioribus approximatis ad c. 6 cm. longis donato, rachide quaquaverse flexuosa, alte bisulcata, colore pedunculi. Bracteae ovario adpressae, concavae, ovato-subquinquangulares, sensim angustatae vel leviter acuminatae, acutae, 5nerviae, dilute virldes, ad c. 2.5 cm. longae, 0.8 cm. latae. Flores pulvinis inserti, majusculi, c. 3.2 cm. lati, 3.7 cm. longi, sepalis petalisque marginibus involutis filiformibus, dilute viridibus. Sepalum dorsale deorsum spectans, explanatum sublineare, apice angustatum, apiculatum, 3nervium, c. 1.9 cm. longum, c. 0.3 cm. latum. Sepala lateralia patentissima, paulum decurvula, explanata sublinearia, acuta, apiculata, 3nervia, c. 2.1 cm. longa, bene 0.3 cm. lata. Petala deorsum spectantia, parva, explanata sublinearia, acute acuminata, minute papilloso-ciliolata, 1nervia, c. 1 cm. longa, fere 0.2 cm. lata. Labellum erectum, magnum, vix recurvulum, convexum, basi medio usque ad infra medium alte cucullatum, cuculla antice visa lineari-oblonga, superne sensim evanescente, dorso late convexo-tricostata, semipellucida, cuculla excepta antice velutino-puberulum, 5nervium, nervis exterioribus valde ramosis, majoribus dorso sulcatis, basi pallide virescens, ceterum dilute ochrascens, pilis fusco-purpureis vestitum, venis vix obscurioribus, fascia longitudinali fusco-pupurea parce obscurius reticulato-venosa in dimidio superiore, explanatum ovato-triangulum, basi truncatum et brevissime 2auriculatum, apice vix acutiuscule acuminatum, c. 2.2 cm. longum, 1.3 cm. latum. Gynostemium brevissimum, recurvum, cum ovario angulum rectum faciens, albidum, clinandrio apice lato bilobo, verruculoso, lobis utrinque bilobulis, auriculis dentiformibus lobulo inferiori clinandrii adnatis (an semper?). Anthera cucullata, ovata, obtusa, interdum apiculata, basi 2lobulata, connectivo convexo-incrassato papilloso flavescenti-albo, c. 0.22—0.24 cm. longa. Pollinia 2, bipartita, falcatula, subclavata, obtusa, partibus extus convexis, flava, cum glandula orbiculari albida c. 0. 23 cm. longa. Rostellum porrectum, bidentatum. Stigma prominens, oblique peltatum, cum rostello suborbiculare et angulum obtusum faciens. Ovarium erectum, apice recurvulum, 6sulcatum, dilute viride, c. 1.7 cm. longum.

Java: Batavia, Krawang, auf dem Goenoeng Boerangrang, am Nordhang, in 1450 m ü. d. M., im Urwalde, viele Exemplare. (C. A. BACKER n. 14439, bl. im Juni 1914). Ebenda, Pasir Kohok in 1220 m ü. d. M., im Walde, (R. C. BAKHUIZEN VAN DEN BRINK, bl. im Juni 1920).

Die Art wurde zuerst im Jahre 1914 in einem einzigen Exemplar von Herrn C. A. BACKER gesammelt. Im Jahre 1920 gelang es Herrn R. C. BAKHUIZEN VAN DEN BRINK die Pflanze an dem nämlichen Standort zurückzufinden, leider aber nur ein blühendes und drei kleine, nicht blühende Exemplare.

Beschreibung nach einer lebenden Pflanze und einem Paar in Alkohol konservierten Blüten.

Cryptostylis conspicua J. J. S.

Rhizom kurz, mit dicken, behaarten Wurzeln. Blätter schief länglich eirund, spitz zugespitzt, an der Basis sehr kurz in den Blattstiel zusammengezogen, mit oben rinniger, unten stark verdickter Mittelrippe und beiderseits 2 ziemlich deutlichen, oben schwach gefurchten, unten etwas vorragenden, grösseren und mehreren dünnen Nerven, locker netzadrig, oben glänzend dunkelgrün mit etwas dunkleren Adern, unten etwas glänzend blass graugrün, krautig, c. 14.5--19.5 cm lang, 6--8.2 cm breit; Blattstiel stielrund, vorn rinnig, glänzend schwarzviolett, 12.5--18.5 cm lang. Blütenstand kräftig, locker vielblütig; Pedunculus stielrund, glänzend schwarzviolett, schwach grünlich punktiert, 35--41 cm lang, mit c. 6 röhrigen Schaftblättern; Rachis tief 2furchig, gefärbt wie der Pedunculus. Brakteen angedrückt, eirund fünfeckig, gegen die Spitze verschmälert oder etwas zugespitzt, 5nervig, hellgrün, bis 25 cm lang, 0.8 cm breit. Blüten ziemlich gross, 3.2 cm breit, 3.7 cm lang, die Sepalen und Petalen weit abstehend durch eingerollte Ränder fädlich, ausgespreizt nahezu linear, hellgrün. Sepalen mit einem Spitzchen, 3nervig, 1.9--2.1 cm. lang, 0.3 cm breit. Petalen zugespitzt, papillös gewimpert, 1nervig, 1 cm lang, nahezu 0.2 cm breit. Lippe gross, aufrecht, kaum etwas zurückgebogen, konvex, an der Basis in der Mitte mit einer starken, bis unterhalb der Mitte reichenden, von vorne gesehen nahzu linearen, allmählich verschwindenden, hinten breit dreirippigen Aushöhlung, vorn ausser der Aushöhlung sammtig, 5nervig, die äusseren Nerven stark verzweigt, an der Basis blassgrünlich, weiter ockergelblich mit braunpurpurner Haarbekleidung, die Nerven kaum etwas dunkler, mit einem braunpurpurnen Längsbande in der oberen Hälfte, ausgespreizt eirund dreieckig, kaum etwas zugespitzt, an der Basis abgestutzt und schwach 2öhrig, 2.2 cm lang, 1.3 cm breit. Säule sehr kurz, zurückgebogen, mit dem Fruchtknoten einen rechten Winkel darstellend, weisslich; Clinandrium an der Spitze breit 2lappig, kleinwarzig, die Lappen beiderseits ausgerandet und mit einem zahnförmigen Öhrchen. Anthere eirund, stumpf, bisweilen mit einem kleinen Spitzchen, mit konvex verdicktem, papillösem Konnectiv, weisslich, 0.22—0.24 cm lang. Pollinien etwas keulig, stumpf, schwach sichelig, gelb. Rostellum 2zähnig, mit dem vorspringenden Stigma fast rund. Ovarium aufrecht, mit ausgebogener Spitze, 6furchig, hellgrün, 1.7 cm lang.

Gastrodia crispa J. J. S. n. sp.

Rhizoma elongatum, horizontale, a dorso compressum, carnosum. Inflorescentia erecta, apice pauciflora, pedunculo tereti, c. 6.5—21.5 cm. longo,

bene 0.3 cm. diam., vaginulis c. 9 tubulosis et nonnullis superioribus bracteiformibus adpressis donato, rachide angulata, c. 3.3 cm. longa. Bracteae oblongo-triangulae, ad bene 1 cm. longae. Flores c. 6, quaquaversi, majusculi, nutantes, c. 1.75 cm., cum mento 1.85—2 cm. longi, 0.95—1.3 cm. lati, mento brevissimo, obtuso, antice viso retuso. Sepalum dorsale oblongum, concavum, 3nervium, totum c. 1.7 cm. longum, parte libera quadrangula, margine apicali incurva et plerumque 2loba, interdum subtruncata, dorso in utraque parte canaliculae longitudinalis convexa et verrucosa, c. 0.5 cm. longa, 0.6 cm. lata. Sepala lateralia margine antico longitudine c. 1.3 cm. connata, oblique oblonga, valde concava, dorso carinata et praesertim in carina verrucosa, 5nervia, c. 1.75 cm. longa, parte libera lata, oblique semiovali-triangula, obtusa, margine antico paucidentata, c. 0.6 cm. longa, 0.75 cm. lata. Petala sepalis multo minora, 1nervia, parte libera oblique quadrangulo-ovata, apice truncato-obtusa, basi utrinque rotundata medio tantum inserta, irregulariter marginata, dorso verrucosa, c. 0.375—0.4 cm. longa, 0.4 cm. lata. Labellum pedi gynostemii insertum, porrectum, leviter sigmoideum, unguiculatum, 3nervium, nervis exterioribus basi ramosis, subtus convexum cum sulco longitudinali et verrucosum, gynostemium subaequans, totum c. 0.7 cm., explanatum 0.76 cm. longum, ungue quadrangulo, callis 2 magnis collateralibus transversis depressis antice oblique bilobulis glabris donato, c. 0.2 cm. longo, ad callos 0.3 cm. lato, lamina ovata, obsolete 3loba, apice obtuso breviter recurvulo spurie retusa, margine $^2/_5$ partibus inferioribus erecta, $^2/_3$ partibus superioribus patente, omnino irregulari et crispata, costis 4 inferne plus minusve confluentibus, 2 medianis in $^2/_3$ partibus supra basin (in flexu) altissimis et obtusangulis, antice productis dilatatis convexis transverse rugulosis apicem labelli attingentibus, costis exterioribus in $^2/_3$ partibus supra basin terminantibus, apice altissimis verruculosisque, $^3/_5$ partibus inferioribus tenuiter transverse rugulosa, c. 0.56 cm. longa, 0.45 cm. lata, lobo intermedio triangulo. Gynostemium subrectum, basi apiceque subaequilatum, basi tenuius, marginibus superne in dentem obtusum inflexum dilatatis, dorso convexum, subtus concavum, c. 0.65 cm. longum, clinandrio concavo margine apicali truncato, auriculis porrectis, triangulis, dentiformibus. Anthera cucullata, suborbicularis, apice truncata, c. 0.14 cm. lata. Stigma basilare. Pes gynostemii brevis, cum ovario angulum acutum faciens, obtusangule incurvus, haud manifeste a basi labelli separatus. Ovarium crassum, obtuse trigonum, 6sulcatum, c. 0.55 cm. longum; pedicellus c. 0.5 cm. longus. Fructus immaturus irregulariter cylindricus, angulatus, sulcatus, conico-verrucosus, 3.2 cm. longus, 0.5 cm. diam.; pedicellus elongatus, 6.3 cm. longus.

Java: Priangan, Bandoeng, Kawah Kamodjan, in c. 1500 m ü. d. M. (W. M. DOCTERS VAN LEEUWEN n. 2410, bl. im März 1918).

Die Art ist verwandt mit *G. verrucosa* BL. und *G. abscondita* J. J. S. und von diesen beiden Arten verschieden durch grössere Blüten, anders

gestaltete Petalen, die krause Lippe mit anders gestalteten Verdickungen, die mit einem deutlichen Zahn verschenen Säulenrändern.

Die Blüten sind nach Angabe des Sammlers weisslich.

Beschreibung nach in Alkohol konserviertem Material.

Gastrodia crispa J. J. S.

Rhizom verlängert, horizontal, vom Rücken zusammengedrückt Blütenstand aufrecht, wenigblütig; Pedunculus c. 6.5--21 cm lang, 0.3 cm dick, mit c. 9 Schaftblättern; Rachis kantig, 3.3 cm lang. Brakteen länglich dreieckig, bis c. 1 cm lang. Blüten c. 6, ziemlich gross, nickend, c 1.85--2 cm lang, 0.9--1.3 cm breit. Mentum sehr kurz, stumpf. eingedrückt. Unpaares Sepalum länglich, konkav, im ganzen c. 1.7 cm lang, der freie Teil viereckig mit an der Spitze eingebogenem Rande und meistens 2lappig, bisweilen abgestutzt, aussen beiderseits einer Längsrinne konvex und warzig, 0.5 cm lang, 0.6 cm breit. Paarige Sepalen mit den Vorderrändern ungefähr 1.3 cm verwachsen, schief länglich, sehr konkav, aussen gekielt und besonders auf dem Kiel warzig, 5nervig, c. 1.75 cm lang, der freie Teil breit und schief halboval dreieckig, stumpf, der Vorderrand etwas gezähnt, c. 0 6 cm lang, 0.75 cm breit. Petalen viel kleiner, 1nervig, der freie Teil schief viereckig eirund, abgestutzt, stumpf, an der Basis beiderseits abgerundet und nur in der Mitte inseriert, unregelmässig berandet, aussen warzig, c. 0.375—0.4 cm lang, 0.4 cm breit. Lippe dem Säulenfuss angeheftet, vorgestreckt, schwach sichelig, genagelt, 3nervig, unten konvex mit einer Längsfurche und warzig, der Säule nahezu gleich lang, c. 0.7 cm, ausgespreizt 0.76 cm lang; Nagel viereckig, mit 2 grossen, niedergedrückten, vorn schief eingedrückten Querschwielen, 0.2 cm lang; Platte eirund, etwas 3lappig, stumpf, unregelmässig berandet und gekräuselt, innen mit 4 nach der Basis hin mehr oder weniger zusammenfliessenden Längsleisten, die 2 mittleren in $^2/_3$ über der Basis stumpfwinkelig verdickt, nach vorne verlängert, verbreitert, querrunzelig und die Spitze der Lippe erreichend, die 2 äusseren in $^2/_3$ über der Basis endigend, dort am höchsten und warzig, ausgespreizt c. 0.56 cm lang, 0.45 cm breit, der Mittellappen dreieckig. Säule nahezu gerade, länglich, am Grunde dünner, mit konvexem Rücken, unten konkav, die Ränder nach oben zu einem dreieckigen, stumpfen, einwärts gebogenen Zahn verbreitert, c. 0.65 cm lang; Clinandrium konkav, am Rücken abgestutzt; Öhrchen vorgestreckt, 3eckig, zahnförmig. Anthere kappig, nahezu rund, an der Spitze abgestutzt, 0.14 cm breit. Narbe grundständig. Säulenfuss kurz, mit dem Ovarium einen spitzen Winkel darstellend, stumpfwinkelig eingebogen. Ovarium dick, stumpf 3kantig, 6furchig, c 0 55 cm lang; Stielchen 0.5 lang. Junge Frucht kantig, warzig, mit verlängertem Stielchen.

Didymoplexis flexipes J. J. S. n. sp.

Rhizoma irregulare, subcylindricum, partim tenue, partim incrassatum, tortuosum, ad c. 0.475 cm. diam., squamatum, radicibus elongatis, tenuibus, tubercula gerentibus. Inflorescentia erecta, laxe pluriflora, glabra, pedunculo

tereti, c. 3.25—8.5 cm. longo, nonnullis (c. 3) vaginulis adpressis triangulis vel basi tubulosis acutis donato, rachide verrucosa, 1.75 cm. superante. Bracteae late subovato-triangulae, valde cucullato-convexae, obtusae, dorso verruculosae, ad c. 0 35 cm. longae. Flores mediocres, quaquaversi, c. 1.2 cm. longi, bilabiati. Sepalum dorsale totum c. 1 cm. longum, concavum, parte libera ovata, obtusa, irregulariter marginata, c. 0.5 cm. longa, fere 0.4 cm. lata, nervis 3 dorso incrassatis verrucosisque. Sepala lateralia magnam partem in labium inferum medio obtusangule recurvum apicibus incurvulis concavum petalis basi utrinque longitudine c. 0.15 cm. adnatum explanatum suborbiculare c. 0.94 cm. longum 0.875 cm. latum connata, obliqua, falcata, 3nervia, nervis 2 exterioribus dorso incrassatis verrucosisque, partibus liberis tegentibus, brevibus, oblique rotundatis, fere 0.2 cm. longis, mento breviusculo, cum ovario angulum acutum faciente, conico, obtuso, retuso, bene 0.2 cm. longo. Petala sepalo intermedio breviora, concava, cum sepalo intermedio labium superum explanatum c. 1.15 cm. longum formantia, 3nervia, nervo postico cum nervo proximo sepali dorsalis confluente, nervo intermedio dorso incrassato et verrucoso, parte libera valde oblique et late ovata, obtusa, margine antico eroso-dentata, margine postico basi rotundato-dilatata, marne postico c. 0.46 cm., margine antico c. 0.7 cm. longa, 0.5 cm. lata. Labellum mobile, simplex, latissimum, marginibus incurvis valde concavum, apice valde recurvum, sigmoideum, breviter cuneato-unguiculatum, incrassatione latissima obovata valde convexa apicem labelli subattigente et apice plus miunsve 3loba basi in appendicem lamelliformem reversam horizontalem transverse quadrangulam apice dilatato leviter rotundato-exciso obtuse bilobulam papillosam unguem aequantem producta, basi excepta erosum, 3nervium, nervis exterioribus ramosis, explanatum e basi breviter cuneato-unguiculata transverse ovale, apice truncatum, c. 0.55 cm. longum, 0.8 cm. latum. Gynostemium subrectum, in utraque stigmatis parte conspicue rotundato-triangulo-dilatatum, dorso convexum, c. 0.45 cm. longum, apice 0.26 cm. latum, apice late truncato, auriculis remotis, porrectis, dentiformibus, acutis. Anthera cucullata, rotundato-quadrangula. Stigma transverse ovale. Pes gynostemii reversus, cum ovario angulum acutum faciens, medio fere acutangule incurvus, apice obtusangule recurvus et papillosus, linearis, apice dilatatus truncatus et excavato-subbilobus, parte inferiore 0.2 cm. longa cum sepalis lateralibus connata, parte superiore 0.26 cm. longa libera. Ovarium 6angulatum, 0.4 cm. longum; pedicellus 1.3 cm. longus.

Java: Batavia, Krawang, auf dem Goenoeng Sanggaboeana in 1200 m ü. d. M., im schattigen, humusreichen Urwalde. (C. A. BACKER n. 23856, bl. im März 1918).

Unter den mir bekannten Arten besitzt diese den am stärksten ausgebildeten Säulenfuss. Die Blüte ist äusserlich der der *D. cornuta* J. J. S. am ähnlichsten. Die Lippe ist quer verbreitert wie bei *D. pallens* GRIFF., jedoch queroval im Umriss.

Die Blüten sind nach Angabe schmutzig violett.
Beschreibung nach 2 in Alkohol konservierten Pflanzen.

Didymoplexis flexipes J. J. S.

Rhizom unregelmässig, zylindrisch, zum Teil dünn, schuppig, mit verlängerten, dünnen, hier und da zu Knöllchen angeschwollenen Wurzeln. Blütenstand aufrecht, locker mehrblütig; Pedunculus c. 3.25—8.5 cm lang, mit sehr wenigen angedrückten, dreieckigen oder an der Basis röhrigen, spitzen Schaftblättern; Rachis warzig, mehr als 1.75 cm lang. Brakteen breit etwas eirund dreieckig, stumpf, stark kappig konkav, aussen warzig, bis 0.35 cm lang. Blüten mittelgross, c 1 2 cm lang. Unpaares Sepalum im ganzen ausgespreizt c. 1 cm lang, konkav, der freie Teil eirund, stumpf, unregelmässig berandet, 0.5 cm lang, fast 0.4 cm breit, mit 3 aussen verdickten, warzigen Nerven. Paarige Sepalen zum grössten Teil zu der in der Mitte stumpfwinkelig zurückgebogenen, an der Spitze konkaven Unterlippe verwachsen, den Petalen an der Basis c. 0.5 cm angewachsen, ausgespreizt im ganzen rundlich, 0.94 cm lang, 0.875 cm breit, schief, sichelig, 3nervig, die äusseren Nerven aussen verdickt und warzig, die freien Teile einander überdeckend, kurz, schief abgerundet, fast 0.2 cm lang; Mentum kurz, kegelig, stumpf, eingedrückt, mit dem Fruchtknoten einen spitzen Winkel bildend, gut 0.2 cm lang. Petalen kürzer als das unpaare Sepalum, konkav, mit dem unpaaren Sepalum die Oberlippe darstellend, 3nervig, der hintere Nerv mit dem benachbarten Nerv des unpaaren Sepalums zusammenfliessend, der Mittelnerv aussen verdickt und warzig, der freie Teil sehr schief und breit eirund, stumpf, der Vorderrand ausgefressen gezähnt, der Hinterrand am Grunde abgerundet verbreitert, am Hinterrand c. 0.46 cm, am Vorderrand 0.7 cm lang, 0.5 cm breit. Lippe beweglich, sehr breit, mit eingebogenen Seiten und stark zurückgekrümmter Spitze, sichelig, kurz keilig genagelt, Sförmig, innen mit einer sehr breiten, verkehrt eirunden, stark konvexen, nahezu bis zur Spitze reichenden und an der Spitze etwas 3lappigen, an der Basis in ein zurückgerichtetes, horizontales, quer viereckiges, an der Spitze verbreitertes, schwach ausgeschnittenes und stumpf 2lappiges, papillöses, dem Nagel gleich langes Querplättchen ausgehenden Längsverdickung, ausser der Basis ausgefressen, 3nervig, ausgespreizt aus kurz keiligem Nagel queroval, an der Spitze abgestutzt, c. 0.55 cm lang, 0.8 cm breit. Säule nahezu gerade, beiderseits der Narbe abgerundet dreieckig verbreitert, c. 0.45 cm lang, an der Spitze 0.26 cm breit; Öhrchen weit auseinander, zahnförmig. Anthere kappig, abgerundet viereckig. Narbe queroval. Säulenfuss mit dem Ovarium einen spitzen Winkel bildend, ungefähr in der Mitte spitzwinkelig eingebogen, an der Spitze stumpfwinkelig zurückgebogen und papillös, linear, an der Spitze verbreitert, abgestutzt und etwas ausgehöhlt zweilappig, der untere, 0.2 cm lange Teil den paarigen Sepalen angewachsen, der obere Teil frei, 0.26 cm lang. Fruchtknoten 6kantig, 0.4 cm lang; Stielchen 1.3 cm lang.

* **Vrydagzynea purpurea** BL. Fl. Javae, Orch. (1858) 60, t. 20, fig. 2;

J. J. S. in Fl. Buit. VI, Orch. (1905), 88; Atlas fig. LIX. — *Hetaeria purpurea* MIQ Fl. Ind. Bat. III (1855), 726.

Caulis e basi longe decumbente radicante adscendens, teres, fusco-viridis, c. 12 - 14 cm. longus, parte erecta c. 3.5 — 5 cm. longa, c. 7—9folia. Folia patentia, parva, elliptico-ovata, acuta, apiculata, basi cuneata, laxe undulata, supra opaca, viridi-nigra, striis 1--3 longitudinalibus fuscescenti-carneis, subtus nitidula, sordide fuscescentia, pallide striata, c. 2 — 3 cm. longa, 0.85—1.8 cm. lata; petiolus cum vagina 0.6 — 1.1 cm. longus, pallide sordide fuscescens. Inflorescentia erecta, apice subdense multiflora, pedunculo tereti, glabro, pallide viridi, c. 0.6 — 1 5 cm. longo, vaginulis 1--2 in bracteas vergentibus donato, rachide glabra, pallide viridi, ad c. 0.6 — 1.5 cm. longa. Bracteae ovario adpressae, triangulae, acutae, concavae, denticulatae, inferiores basi ciliatae, dorso parce clavato-puberulae, 1nerviae, membranaceae, fuscescenti-carneae, ad c 0.6 cm. longae. Flores vix aperti, carnosuli, cum calcari c. 0.9 cm. longi, sepalis parallelis, dorso ad basin nonnullis pilis clavatis reversis inspersis, dimidio inferiore dilutius olivaceis, dimidio superiore albis, praesertim sepalis lateralibus medio fuscescenti-suffusis. Sepalum dorsale sigmoideum, lanceolatum, in $^2/_3$ supra basin constrictum, acutum, apice intus convexo-incrassatum, 1nervium, fere 0.6 cm. longum, 0.16 cm. latum. Sepala lateralia sigmoidea, oblique oblongo-ovata, apicem versus sensim angustata, acuta, apiculata, valde canaliculato-concava, dorso convexa, basi antice dilatata et basi calcaris arcte adpressa, 1nervia, fere 0.7 cm. longa, 0.26 cm. lata. Petala sepalo dorsali agglutinata, multo breviora, oblique triangulo-ovata, apicem versus angustata, obtusa, margine exteriore in lobulum rotundatum dilatata, 1nervia, semipellucida, fascia mediana cum apice alba, margine interiore dilute viridia, margine exteriore basi olivacea, medio fuscescentia, bene 0.4 cm. longa, basi 0.17 cm. lata. Labellum calcaratum, usque ad apicem ovarii c 0.4 cm., cum calcari 0.75 cm. longum; lamina cum calcari sinum rotundatum faciens, apice incurva, basi utrinque gynostemio adpressa, concava, marginibus praesertim superne valde incurvis cucullata, ambitu oblonga, obtusa, obtuse apiculata, intus medio convexo-incrassata et papillosa, subtus convexa cum sulco longitudinali, alba, inexplanata c. 0.35 cm. longa, 0.15 cm. lata; calcar ovario adpressum, oblongum, subcylindricum, vix lateraliter compressum, antice ventricosum, obtusum, basi paulum contractum semipellucide album, usque ad apicem ovarii c 0.35 cm longum, glandulis 2 stipitatis in c. $^1/_3$ supra basin calcaris solutis, apicem longe non attingentibus, c. 0.14 cm longis. Gynostemium e basi angusta cuneato-dilatatum, pallide flavescens, totum c. 0.225 cm. longum, clinandrio magno, alte excavato, pariete membranaceo, margine antice utrinque in lobulum porrectum triangulum antheram aequantem producto. Anthera cucullata, basi in clinandrium immersa, quinquangularis, basi cordata, apice obtusangula, connectivo conspicuo, in appendicem horizontalem apici antherae parallelam et similem pallide fuscescentem producto, alba, c 0.08 cm. lata. Pollinia 2, oblique clavata, antice sulcata, sectilia, pallide flava, cum glandula suborbiculari hyalina c. 0.2 cm. longa. Rostellum porrectum, stigmata longe superans, late oblongum. Stigmata antheram superantia, porrecta, sinu rotundato separata, a dorso compressa, supra convexa, rotundata, nitida. Ovarium erectum, tortum, 6sulcatum, glabrum, fasciis 6 pallide viridibus cum 6 obscurioribus fuscescenti-suffusis alternantibus.

Java: Banten, Goenoeng Pajong. (J. C. VAN HASSELT). Batavia, Buitenzorg, Tapos. (Kult. in Hort. Bog.).

Diese Art ist nach ungefähr einer Jahrhundert wieder aufgetaucht BLUMES Figur ist ausser der Färbung gut.

* **Macodes robusta** J. J. S. n. sp.— *M. Petola* LNDL. var. *robusta* J. J. S. in Fl. Buit. VI, Orch. (1905), 104.

Planta robusta, caule e basi decumbente radicante adscendente, cylindrico, carnoso, dilute sordide viridi, pallide punctato, parte erecta c. 6—10 cm. longa, 0.9—1.1 cm. diam., c.5 - 7folia. Folia patentia, petiolata, leviter obliqua, subovato-elliptica, brevissime acuminata, apice canaliculata, curvinervia, carnosa, supra velutino-atroviridia, nervis majoribus costa excepta inconspicue et tenuissime argenteo-striata, subtus pallide viridia, c. 12 cm. longa, 6.5—7 cm. lata; petiolus canaliculatus, carnosus, c. 4 – 4.5 cm. longus, cum vagina tubulosa c. 1 cm. longa pallide viridis. Inflorescentia erecta, dense multiflora, cylindrica, pedunculo tereti, basi glabro, superne breviter subglanduloso-pubescenti, dilute viridi, c. 17.5—29 cm. longo, inferne 0.6—0.7 cm. diam., vaginulis c. 3 foliaceis decrescentibus in bracteas vergentibus puberulis donato, rachide glanduloso-pubescenti, c. 13 cm. longa, cum floribus c. 3.5 cm. diam. Bracteae adpressae, oblongo-triangulae, acutae, concavae, glanduloso-pubescentes, 1nerviae, intus nitidae, virides, fuscescenti-suffusae, c. 0.9 cm longae, 0.4 cm. latae. Flores non resupinati, patentes, asymmetrica, c. 1.1 cm. lati, sepalis dorso pilis partim glanduliferis vestitis. Sepalum dorsale horizontale, ovatum, valde concavum, marginibus superne incurvis apice contractum, obtusum, fuscum, costa media marginibusque pallide flavescens, semipellucidum, c. 0.55 cm. longum, 0.33 cm. latum. Sepala lateralia divergentia, oblique ovata, inaequilatera, obtusa, basi valde obliqua, inaequaliter concava, semipellucida, fusca, basi praesertim latere interiore dilute olivacea, apice costa media marginibusque albescentia, c. 0.65 cm., tota 0.85 cm. longa, 0.525—0.55 cm. lata. Petala sepalo dorsali leviter agglutinata, paulo inaequalia, undata, oblique linearia, inaequilatera, obtusa, latere interiore angusto albida, ceterum fusca cum apice margineque pallide flavescentia, semipellicida, c. 0.6—0.625 cm. longa, 0.125 – 0.15 cm. lata. Labellum valde asymmetricum, 3lobum, saccatum, inexplanatum fere 0.5 cm. longum, incrassationibus 2 longitudinalibus parallelis dilute fuscescenti-carneis inter lobos laterales ad basin lobi intermedii; lobi laterales ad faucem calcaris, oblique rotundati, margine valde incurvo concavi, albi; lobus intermedius multo longior, valde oblique recurvus, spathulatus, canaliculatus, albus, ungue marginibus incurvis basi fere tubuloso, lineari, costulis 2 inconspicuis sulco separatis instructo, lamina margine apicali incurvo biloba; saccus rotundatus, utrinque plica introrsa duplicata instructus, longitudinaliter sulcatus, pallide virescens et fuscescens, intus costa longitudinali et glandulis 2 conicis valde falcato-curvatis donatus. Gynostemium reversum, cum ovario angulum rectum faciens, subtortum, album, c. 0.4 cm. longum, lamellis 2 verticalibus applicatis oblique triangulis obtusis margine antico erosis margine postico dimidio inferiore connatis albis in saccum quadrantibus subtus infra stigma, clinandrio alte excavato, truncato. Anthera cucullata, basi in clinandrium immersa, ovata, acutissime acuminata, flavescenti-alba. Pollinia 2, clavata, pallide flavescentia, cum glandula triangula c. 0 24 cm. longa. Rostellum magnum, alte bipartitum, album, laciniis oblique oblongis, obtusis. Stigma magnum, quam gynostemium latius, transverse 6angulatum, margine subcrenulatum. Ovarium fusiforme, glanduloso-pilosum, viride, c. 0.9 - 1.1 cm. longum.

Java: Buitenzorg, Tjisalak, mehrere Exemplare epiphytisch zwischen den Wurzelen eines *Polypodium Heracleum* O. K. in c. 5 m über den Boden. (W. M. DOCTERS VAN LEEUWEN, leb Pfl. kult. in Hort. Bog.).

Diese Pflanze, die ich früher als eine Varietät von *M. Petola* LNDL. beschrieben habe, ist wie ich an frischem Material habe feststellen können, sicher spezifisch verschieden, wenn auch die Blüten sehr ähnlich sind.

Sie unterscheidet sich von *M. Petola* durch den viel kräftigeren Wuchs, anders gefärbte Blätter, dichten Blütenstand, einen mit 2 nur schwachen Längsrippchen versehenen Mittellappen, viel stärker gekrümmte Drüsen im Sporn, ein kürzeres Rostellum und viel grösseres Stigma.

Bemerkenswert ist es, dass Herr Dr. DOCTERS VAN LEEUWEN sie epiphytisch wachsend antraf.

* **Dicerostylis lanceolata** BL. Fl. Jav. Nov. Ser. I, Orch. (1858), 98, t. 30, fig. 1; J. J. S. in Fl. Buit. VI, Orch. (1905), 117; Atlas, fig. LXXXV. — *Hylophila lanceolata* MIQ. Fl. Ind. Bat. III (1855), 746; HOOK. F. Fl. Br. Ind. VI (1890), 110; RIDL. Mat. Fl. Mal. Penins I (1907), 223.

Caulis validus, e basi decumbente radicante erectus, teres, carnosus, sordide atroviridis, inferne nigrescens, vix nitidulus, c. 27—40 cm. longus, 0.7—0.95 cm. diam., superne foliatus. Folia c. 6—7, patentia, sensim acuminata, acuta, basi in petiolum acuminata, undulata, costa media supra sulcata subtus valde obtuse prominente, nervo subconspicuo utrinque, herbacea, viridia, subtus pallidiora, maxima c. 16,5—18 cm. longa, 3—4,5 cm. lata; petiolus canaliculatus, cum vagina tubulosa pallide viridi-nervosa ad c. 4—5.5 cm. longus. Inflorescentia erecta, quam folia brevior, dense multiflora, pedunculo tereti, superne sparse subadpresse piloso, c. 4.5—5 cm. longo, vaginulis c. 3 tubulosis infima foliacea superioribus adpressis acute acuminatis in bracteas vergentibus donato, rachide parce pilosa, olivacea, c. 6.5—10 cm. longa. Bracteae subadpressae, cymbiformi-concavae, triangulo-lanceolatae, sensim longe acuminatae, sparse glanduloso pilosae, pallide rubiginosae, basi pallide virescentes, ad c. 1.5—1.6 cm. longae. Flores mediocres, quaquaversi, erectopatentes, recurvi, lateraliter compressi, c. 0.95 cm. longi, 0.75 cm. lati. Sepalum dorsale cum ovario angulum obtusum formans, valde concavum, inferne cucullato-excavatum, margine incurvum, explanatum ovatum, acuminatum, obtusum, sparse patenter glanduloso-pilosum, dilute rubiginosum, basi pallide viride, apice extremo albidum, c. 0.8 cm. longum, 0.4 cm. latum. Sepala lateralia porrecta, leviter divergentia, apice recurva, labellum totum obtegentia, late oblique ovata, inaequilatera, obtusa, marginibus acuminis incurva, concava, costa media intus sulcata, dorso sparse glanduloso-pilosa, dilute rubiginosa, basi pallide olivacea, costa media olivacea, apice alba, c. 0.77 cm. longa, 0.64 cm. lata. Petala sepalo intermedio agglutinata, late et valde oblique rhombea, valde inaequilatera, in apicem triangulum acuminata, obtusiuscula, concava, margine exteriore laxe undulata, glabra, 3nervia, alba, dimidio interiore praesertim superne carnea, c. 0.77 cm. longa, 0 5 cm lata. Labellum cum ovario angulum acutum faciens, supra basin lateraliter compressam apertam in saccum subglobosc-inflatum intus nudum et longitudinaliter sulcatum melliferum auctum, 3lobum, marginibus supra basin incurvis contiguisque lobulis lateralibus basilaribus parvis obliquis obtusis, apice in epichylium lineare obtusum recurvulum sacco adpressum basi breviter lobulato-incrassatum, contractum, gynostemium aequans, c. 0.5 cm. longum. Gynostemium erectum, subtus infra stigma alis 2 angustis infra stigma in appendices breves subulatas divergentes exeuntibus instructum, album, dorso fuscescens, totum c. 0.525 cm. longum, clinandrio conspicuo, cum gynostemio angulum rectum faciente, alte excavato, oblongo. Anthera in clinandrium immersa, oblonga, acuminata, acuta, apice recurvula, basi obtuse 2loba, dilute rubiginosa, marginibus apiceque pallida, basi pallide flavescens, c. 0.43 cm. longa. Pollinia 2, bipartita, curvula, lineari-oblonga, a latere compressa, flava, cum glandula magna lanceolata antice 2denticulata pellucide flava c. 0 46 cm. longa. Rostellum porrectum, elongatum, 2partitum, subflavescens, laciniis oblongis, obtusis, clinandrii marginibus decurrentibus triquetris. Stigma in facie inferiore gynostemii, in rostellum paulum decurrens, plus minusve Uforme. Ovarium tortum, 6sulcatum, sparse patenter glanduloso-pilosum, dilute viride, c. 1 cm. longum Fructus erecto-patens, sessilis, oblongo-fusiformis, cylindrico-trigonus, 3costatus, sparse pilosus, immaturus pallide ochrascens, pallide fusco-suffusus, c. 1.5 cm. longus.

Java: Im Westlichen Teile. (BLUME). Batavia, Buitenzorg, Goenoeng Tjipoetih vorbei Tjiampea in 600 m ü. d.M. (R. C. BAKHUIZEN VAN DEN BRINK, bl im November 1920). Priangan, Goenoeng Karang bei Soekanegara in c. 1000 m ü. d. M., im Urwalde. (R. C. BAKHUIZEN VAN DEN BRINK, bl. und fr. im Juli 1918).

Sumatra: Agam, Boekit-Batoe Banting. (E. JACOBSON, kult. sub n. 1562). Laras Talang, Boekit Gombak, 1600 m, im Walde. (H. A. B. BÜNNEMEIJER n. 5443, November 1918).

Malaiische Halbinsel: Perak. (SCORTECHINI). Bojong Malacca (CURTIS).

BLUMES Beschreibung und Tafel sind gut, nur werden die Blüten von ihm einfach weiss genannt.

HOOKER F. und RIDLEY geben die Art auch für die Malaiische Halbinsel an. Exemplare von dort habe ich nicht gesehen.

Beschreibung nach wenigen lebenden, von Herrn BAKHUIZEN VAN DEN BRINK gesammelten Exemplaren.

* **Goodyera viridiflora** BL. Fl. Jav. Orch. (1858), 34, t. 9, fig. 2; J. J. S. in Fl. Buit. VI, Orch. (1905), 119; Atlas fig. LXXXVI. - *Neottia viridiflora* BL. Bijdr. 408; LNDL. Gen. et sp. Orch (1840), 494.— *Physurus viridiflorus* LNDL. in Journ. Linn Soc. I (1857), 180; MIQ. Fl. Ind. Bat III (1855), 734.— *Orchioides viridiflorum* O. K. Rev. gen. pl. II (1891), 675.

Caulis decumbens, adscendens, radicans, teres, dilute glauco-viridis, post florescentiam 1 ramum emittens, ramo c. 4 – 8 cm. longo, c. 4folio. Folia erecto patentia, oblique ovata, acuta, minute undulata, nervis 3 supra sulcatis subtus prominentibus, supra nitentia, dilutius glauco-viridia, subtus nitida et pallidiora, c. 3.3 - 6 cm. longa, 2.25 – 3.1 cm. lata; petiolus canaliculatus, viridi-albus, cum vagina brevi tubulosa c. 2—3 cm. longus. Inflorescentia erecta, laxe pluriflora, pedunculo tereti, pubescenti, pallide viridi, c. 12 cm. longo, vaginulis 2 basi tubulosis donato, vaginula infima glabra, vaginula summa ciliata, c. 2.7—2 cm. longa, rachide pubescenti, pallide viridi, fructifra c. 7.5 cm. longa. Bracteae ovario adpressae, e basi dilatata sensim longe acuminatae, concavae, ciliatae, ceterum glabrae, 3nerviae, semipellucide pallide virescentes, valde brunnescenti-suffusae, ad c. 1.85 cm. longae. Flores c. 8, quaquaversi, erecti, valde aperti, c. 1.6 cm. lati, sepalis concavis, basi dorso parce pubescentibus, semipellucidis, nitidulis. Sepalum dorsale erectum, petalis in formam cuculli agglutinatum, oblongo-ovatum, apicem versus sensim angustatum, apice anguste obtusum et minute cucullatum, valde concavum, dilute viridi fuscum, apice brunneum, c. 1 cm. longum, bene 0.4 cm. latum. Sepala lateralia divaricata, oblique oblongo-ovata, anguste obtusa, concava, ima basi tantum convexa, dilute olivacea, apice brunnea, c. 0.9 cm., margine antico 0.975 cm. longa, 0.425 cm. lata. Petala sepalo dorsali agglutinata, marginibus proximis $^{2}/_{5}$ partibus superioribus conglutinata, oblique rhombea, inaequilatera, obtusa, basi subunguiculato-angustata, concava, 1nervia, pallide olivacea, dimidio postico et apice brunnescentia, semipellucida, c. 0.925 cm. longa, 0 4 c. lata. Labellum parallelum gynostemio erectum, marginibus inferne rotundatis gynostemio utrinque adpressum, ventricosum, apice contractum, abrupte reflexum, deinde apice incurvulum et concavum, parte ventricosa intus densius muriciferum, 5nervium, flavum, albo-marginatum, apice album cum stria longitudinali brunnea, inexplanatum, c. 0.5 cm. longum, 0.3 cm. latum, explanatum transverse ovale, in epichylium triangulum obtusum marginibus apicalibus incurvis acutum c. 0.25 cm. longum 0.2 cm. latum abrupte contractum, totum c 0.875 cm. longum, plane explanatum 0.9 cm. latum Gynostemium dorso convexum, brunnescens, basi pallide viride, totum fere 0.7 cm. longum, clinandrio magno, oblongo, excavato. Anthera cucullata, e basi cordata longissime acuminata, c. 0 6 cm. longa. Rostellum porrectum. elongatum, alte bipartitum. laciniis subulatis, acutis, concavis. Stigma margine valde productum, manifeste cucullatum, antice apertum, quam clinandrium latius. Ovarium erectum, sessile, sparse brevius pubescens, c. 1.1 cm. longum.

Java: Buitenzorg, auf dem Salak in den unteren Wäldern. (BLUME). Ebenda. (R. C. BAKHUIZEN VAN DEN BRINK, bl. im April 1918).

Priangan, Gede oberhalb Tjibodas in c. 1600 m ü. d. M., im Urwalde. (J. J. SMITH, im Juni 1906, nahezu abgeblüht).

Die Beschreibung wurde angefertigt nach einem lebenden, von Herrn R. C. BAKHUZEN VAN DEN BRINK auf dem Salak gesammelten Exemplar. Ich bin noch nicht völlig davon überzeugt, ob die Exemplare vom Gede der nämlichen Art angehören oder vielleicht besser eine Varietät darstellen. Ich habe die Pfanze einige Male bei Tjibodas gefunden, aber stets völlig oder nahezu abgeblüht.

Pholidota camelostalix RCHB. F. in Bonpl. V (1857), 43; Xenia Orch. I (1858, 217, t. 89; J. J. S. in Fl. Buit. VI, Orch. (1905), 157; Atlas Fig. CXVII.--*Coelogyne camelostalix* RCHB. F. in WALP. Ann. VI (1861), 238.--*Camelostalix Reichenbachii* PFITZ. in Pflanzenz. Heft 32 (1907), 160.

Rhizoma breve, bene ramosum, vaginis imbricantibus, obtusis, coriaceis, infra pseudobulbos accrescentibus, ad c. 6--8.25 cm. longis. Pseudobulbi approximati, oblongo-ovoidei, obtusi, angulati, late canaliculati, 2folii, virides, c. 3.75--6.75 cm. longi, 2.5 cm. diam. Folia lanceolata, sensim angustata vel plus minusve acuminata, acuta, basi acuta in petiolum angustata, laxe undulata, costa media supra leviter sulcata subtus obtuse prominente, coriacea, sicco papyracea, utrinque nitide viridia, c. 15--25 cm. longa, 2.5-4.4 cm. lata; petiolus canaliculatus, c. 2--2.8 cm. longus. Inflorescentiae in pseudobulbis evolutis, nutantes, laxe multiflorae, elongatae, pedunculo erecto, sectione transversa elliptico, dilute viridi, c. 6.25--16 cm. longo, rachide valde serpentina, glabra, dilute viridi, c. 20--30 cm. longa, internodiis c. 0.45--0.7 cm. longis. Bracteae caducae, initio imbricatae, ovales vel plus minusve ovatae, apice rotundatae vel obtusae, interdum apiculatae, firmulae, nitidae, c. 1--1.5 cm. longae, 0.6--0.8 cm. latae. Flores mediocres, patentes. Sepalum dorsale ovatum ad suboblongo-ovatum obtusum vel subobtusum, basi latum, valde concavum, 3nervium, c. 0.525--0.65 cm. longum, 0.3--0.375 cm. latum. Sepala lateralia cymbiformia, oblique ovata ad triangula, acuta, plus minusve apiculata, valde carinata, 3nervia, c. 0.6--0.75 cm. longa. Petala oblique oblonga ad elliptica vel subovato-elliptica, apice plus minusve saepe conspicue contracta, obtusa, 3nervia, nervis exterioribus brevibus, c. 0.46--0.5 cm. longa, 0.2--0.3 cm. lata. Labellum brevissime unguiculatum, basi saccatum, 3lobum, sigmoideum, 5nervium, incrassatione transversa costiformi supra basin, explanatum c. 0.525--0.65 cm. longum, ad lobos laterales 0.3--0.45 cm. latum; saccus rotundatus; lobi laterales ad marginem sacci erecti, breves, rotundati vel angulato-rotundati, a lobo intermedio sinu rotundato sejuncti; lobus intermedius porrectus, recurvulus, oblongus vel late oblongus, saepe plus minusve quinquangularis, obtusus, superne convexus et interdum plus minusve undulatus c. 0.26--0.325 cm. longus, 0.17--0.25 cm. latus. Gynostemium oblique clavatum, dorso supra basin plus minusve constrictum et apice valde incrassatum, facie inferiore rectum vel raro recurvulum, trigonum, c. 0.275--0,35 cm. longum, clinandrio valde excavato cucullato, margine plus minusve dentato, auriculis distinctis plerumque manifeste 2dentatis, decurrentibus. Anthera conspicua, cucullata, ambitu sexangulata, basi rotundato-biloba, apice truncata, connectivo incrassato, c. 0.175--0.2 cm. lata. Pollinia 4, flabellato-disposita, obovata, pallide flavescentia, cum caudiculis latis planis c. 0.15 cm. longa. Rostellum cum stigmate valde prominens, apicem gynostemii longe superans, antheram aequans, valde oblique cupuliforme, margine inferiore incurvum. Ovarium obconicum, 6sulcatum, c. 0.25 cm. longum, virescens; pedicellus tenuior, c. 0.13--0.23 cm. longus.

Java: Priangan, Gede bei Tjipanas, c. 1100 m ü. d.M. (H. ZOLLINGER). Gegerbentang, c. 2000 m ü. d M., im Walde. (TJ. WOUTERS und J. J. SMITH, bl. im Juni 1905). Papandajan am Südhang, 1500--1700 m ü. d. M. (L. B. VAN DER HEGGE ZYNEN, leb. Pfl.). Goentoer. (W. BURCK n. 430, bl. im Juli 1891; A. E. KERKHOVEN n. 26).

Pasoeroean, Tengger am Nordhang, oberhalb Desa Ngepoeh in 1500 m ü. d. M. (J. VAN HARREVELD n. 33, bl. im April 1915).

Besoeki: Goenoeng Hijang, am Fusse des Goenoeng Koekoesan, in 2000 m ü. d. M. (C. A. BACKER n. 9865, bl. im Oktober 1913).

Unter den vom Gede stammenden Exemplaren findet sich eins, das wahrscheinlich nahezu mit dem REICHENBACHschen Typ übereinstimmt. Bei allen anderen untersuchten Exemplaren ist die Säule an der Unterseite gerade, nur bei dieser einen Pflanze tatsächlich schwach aufwärts gekrümmt, wenn auch sehr viel weniger als in der REICHENBACHschen Figur. Auch könnten die Petalen nur hier linear lanzeulich genannt werden.

Beschreibung nach Herbar und einer lebenden Pflanze.

var. *grandiflora* J. J. S. n. var.

Rhizoma abbreviatum, vaginis ad c. 14 cm. longis, radicibus crassiusculis Pseudobulbi c. 7—10 cm. longi. Folia c. 22—40 cm. longa, 2.8—5 cm. lata; petiolus c. 1—4 cm. longus. Pedunculus c. 9.5—30 cm. longus; rachis c. 19—38 cm. longa, internodiis c. 0.4—0.75 cm. longis. Bracteae steriles ad c. 3.5—6.5 cm. longae. Flores majores. Sepalum dorsale ovato-ovale, obtusum, concavum, c. 0.75—0.85 cm. longum, 0.45—0.56 cm. latum. Sepala lateralia c. 0.84—1 cm. longa. Petala oblique oblongo- ad ovato-elliptica vel rhombea, apicem versus angustata sed non contracta, obtusa, c. 0.65—0.72 cm. longa, 0.28—0.4 cm. lata. Labellum e basi late saccatum antice in lobum quinquangularem apice breviter obtuse contractum recurvum convexum undulatum incrassationibus 2 convexis instructum productum, sigmoideum, haud vel obsolete 3lobum, 5nervium, explanatum c. 0.8—0.9 cm. longum,

hypochylio ovato, c. 0.5 – 0.63 cm. lato, epichylio c. 0.3 – 0.33 cm. longo, 0.3—0.35 cm. lato. Gynostemium oblique clavatum, facie inferiore rectum, dorso sigmoideum, apice dorso valde incrassatum, c. 0.475—0.54 cm. longum, clinandrio valde excavato, auriculis bidentatis. decurrentibus. Rostellum semiorbiculare, supra valde convexum, cum stigmate valde prominens, cupulam obliquam margine incurvam formans. Ovarium obconicum, 6sulcatum, c. 0.33 cm. longum; pedicellus 0.2 cm. longus.

Java: Priangan, Gede, Tjibodas, in 1450 m d. ü. M. (S. H. KOORDERS n. 31965 β, bl. im Oktober 1898). Gegerbentang, c. 2000 m ü. d. M. (TIRTO, KDS. n. 40103 β, bl. im Dezember 1902; L. G. DEN BERGER n. 632, September 1918, steriel). Auch kult. in Hort. Tjibodas.

Pekalongan, Petoeng Kriana, in 1400 – 1500 m ü. d. M. im sekundären Walde, an vielen Bäumen. (C. A. BACKER n. 15865, bl. im September 1914).

Kedoe G. Tlerep Nordosthang, in c. 1800 m ü. d. M., an einer Schluchtwand zwischen Farnkräutern und Sträuchern auf sehr humusreichem Boden. (J. A. LÖRZING n. 595, bl. im August 1912).

Semarang, G. Telomojo, in 1700 m ü. d. M. (W. M. DOCTERS VAN LEEUWEN n. 188, fr. im Juli 1911).

Ich habe gemeint hier eine Varietät abtrennen zu müssen. Nicht nur sind die Blüten im allgemeinen grösser, sondern es gehen auch andere Merkmale damit gepaart. Das unpaare Sepalum ist breiter, die Petalen sind nicht zusammengezogen, die Lippe ist nicht oder kaum angedeutet dreilappig und die Säule länger.

Ich glaube nicht, dass die Pflanzen spezifisch verschieden sind. Dazu sind die Merkmale doch zu variabel.

Die Grösse der Blüten ist ziemlich verschieden, wie auch die Form des unpaaren Sepalum. Die Petalen sind bei der Art bisweilen kaum zusammengezogen, die Seitenlappen der Lippe mehr oder weniger stark ausgebildet, während sie bei der Varietät bisweilen schwach ausgebildet sind.

Das Exemplar vom G. Telomojo ist bereits in Frucht übergegangen, gehört aber wahrscheinlich hierher.

Es ist erwünscht die Art und die Varietät an lebendem Material zu studieren.

Die Blüten sind blass bräunlich oder blass braungelblich.

Beschreibung nach Herbar.

* **Eulophia javanica** J. J. S. n. sp.

Pseudobulbi subterranei vel fere subterranei, approximati, oblique depresse ovales, carnosi, pallide virides, parte soli exposita virides, c. 6.5 cm. longi, 3.5 cm. diam., c. 4folii, internodiis brevibus, obliquis, radicibus crassis, innovationibus basi vaginis c. 3 tubulosis accrescentibus donatis. Folia erecta, patentia, petiolo et vagina cauliformi-amplectentia, lanceolata, sensim acute acuminata, basi acuta, plicata, nervis c. 9 supra sulcatis subtus prominentibus, membranacea, opaca, dilute viridia, subtus leviter pallidiora, c. 36--52 cm. longa, 5.4--6 cm. lata; petiolus late canaliculatus, acute trian-

gulatus, cum vagina tubulosa angulata pallide viridi obscurius nervosa c. 17--26 cm. longus. Inflorescentiae c. 2, ex axillis inferioribus foliis synanthae, erectae, laxe vel laxius multiflorae, pedunculo subtereti, glabro, dilute viridi, c. 15--23.5 cm. longo, 0.43 cm. diam., vaginulis c. 3 in bracteas vergentibus summa excepta tubulosis superne conduplicatis acutiusculis pallidis superne dilute viridibus ad c. 4.75--6 cm longis donato, rachide obtuse angulata, glabra, dilute viridi, c. 13.5--30 cm. longa. Bracteae patentes, anguste lanceolatae, sensim acuminatae, concavae, glabrae, pallide virides, nervis 5--3 obscurioribus, ad c. 2.5--2.75 cm. longae, 0,4 – 0.5 cm. latae. Flores ad c. 22, patentes, pallide virides, c. 2.6--3.3 cm. lati, sepalis lateralibus patentibus Sepalum dorsale lanceolatum, apicem versus angustatum, obtusum, obtuse apiculatum, basi medio tantum insertum et utrinque rotundatum, convexum, 5nervium. c. 1.85 cm. longum, 0.55 cm. latum. Sepala lateralia pedi gynostemii a sepalo dorsali remote inserta, divergentia, apice recurva, basi calcar amplectentia, oblique lanceolata, subfalcatula, apicem versus sensim angustata, acuta, obtusangule concava, 5nervia, nervis praesertim costa media dorso obtuse prominentibus, 0,2 cm. longa, basi 0.6 cm. lata. Petala ad pedem gynostemii decurrentia, porrecta, marginibus proximis anguste tegentia, apice breviter recurva, oblique oblonga, obtusa, concava, fascia mediana praesertim basi apiceque convexa, 3nervia, costa media dorso prominente, quam sepala pallidiora, c. 1.5 cm. longa, bene 0.6 cm lata. Labellum ungue brevi pedi gynostemii in formam calcaris reversi cum parte inferiore pedis gynostemii angulum obtusum facientis breviter conici anguste obtusi c. 0.175 cm. longi adnatum, arcuato-recurvum, concavum, obsolete 3lobum, oblongum, intus inferne 5costatum, costis parallelis, infra medium evanescentibus, in $^{1}/_{3}$ supra basin sulco duplicatis, pallide virescens, fascia longitudinali dilute flava apicem non attingente, inexplanatum absque calcari c, 1 cm., explanatum totum 1.75 cm. longum, ungue 0.23 cm. longo, ad lobos laterales 0.6 cm. latum; lobi laterales erecti, concavi, basi lati, breves, late rotundati; lobus intermedius sinibus latissimis a lobis lateralibus sejunctus, quadrangulus, apice truncato-rotundatus, undulatus, concavus, c. 0.66 cm. longus, 0.675 cm. latus. Gynostemium longiusculum, vix curvatum, basin versus non dilatatum, subtus concavum, apice late rotundato-triangulo-productum, c. 0.63 cm. longum. Anthera cucullata, obverse triangula, apice late truncata, emarginata cum lobulis 2 minimis in sinu, thecis convexis, connectivo basin versus incrassato et in appendicem transversam dilatatam 3lobam producto, lobulo intermedio lato obtuso convexo, lobulis lateralibus divergentibus patentibus rotundato-quadrangulis apice purpureo suffusis aequilongis, pallida, basi sulphurea, c. 0,23 cm. lata. Pollinia 2, transversa, triangula, angulo exteriore rotundata, dorso transverse fissa, flava, cum stipite late ovato-triangulo antice convexo et glandula transverse dilatata brevi alba c. 0.15 cm. longa. Rostellum cum gynostemio angulum rectum faciens, truncatum, antice convexum. Stigma magnum, semiovale, margine inferiore subtruncatum. Pes gynostemio cum ovario angulum acutum fere rectum faciens,

rectus, oblongus, canaliculatus, dorso 5costatus, crasse carnosus, apice contractus obtusangule recurvus et ungui labelli adnatus, totus c. 0.6 cm. longus. Ovarium pedicellatum rotundato-trigonum, 6sulcatum, c. 1.7 cm. longum.

Java: Priangan, Tjibeber, Tjidadap, in c. 1000 m ü. d. M., in Theeplantagen, stellenweise viel. (W. F. WINCKEL, bl. im November und Dezember 1915).

?Semarang, im Hügelland unter Sträuchern. (W. M. DOCTERS VAN LEEUWEN n. 2247, bl. im Dezember 1914).

?Soerabaja, Krondang, im Djatiwalde. (L. G. DEN BERGER n. 249, bl. im Oktober 1927).

Diese Pflanze ist nahe verwandt mit *Eu. squalida* LNDL., jedoch verschieden durch das mehr verzweigte Rhizom, meistens kürzere, dichtere Blütenstände mit zugleicher Zeit geöffneten, anders gefärbten Blüten, abstehende Sepalen, schmälere Petalen und Lippe, einen kürzeren Sporn, eine gegen die Basis nicht verbreiterte Säule und besonders durch die Form der Anthere, die bei *Eu. squalida* an der Spitze in ein vierkantiges, eingedrücktes Schnäbelchen ausgezogen, bei *Eu. javanica* ausgerandet ist mit 2 sehr kleinen Läppchen im Sinus. Ich habe mehrere frischen oder in Alkohol konservierten Blüten der *Eu. squalida*, von Java, Sumatra, Nias und dem Soela- Archipel stammend, untersucht, aber die Form der Anthere ist im Grossen und Ganzen konstant, wiewohl kleine Abweichungen selbstverständlich vorkommen.

Die Beschreibung der Blüten der *Eu. lutea* BL. erinnert sehr an *Eu. javanica* J. J. S. und besonders an *Eu. squalida* LNDL. Nach der Beschreibung der vegetatieven Teile sollte man jedoch glauben mit einer der *Eu. macrostachya* LNDL. ähnlichen Pflanze zu tun zu haben.

Beschreibung nach in meinem Garten kultivierten, mir freundichst von Herrn W. F. WINCKEL geschenkten Pflanzen.

Eulophia javanica J. J. S.

Trugknollen unterirdisch oder nahezu unterirdisch, genähert, schief niedergedrückt oval, fleischig, blassgrün, der dem Lichte ausgestellte Teil grün, c. 6.5 cm lang, 3.5 cm breit, c. 4blättrig; Wurzeln dick. Blätter einander mit Stiel und Scheide umfassend, abstehend, lanzettlich, allmählich spitz zugespitzt, längsfaltig, mit c. 9 unten vorragenden Nerven, dünn, hellgrün, c. 36—52 cm. lang, 5.4—6 cm. breit; Stiel breit rinnig, 3kantig, mit der röhrigen, blassgrünen, dunkler nervigen Scheide 17—20 cm. lang. Blütenstände c. 2 an den jungen Trieben, aufrecht, locker oder ziemlich locker vielblütig; Pedunculus nahezu stielrund, c. 15 – 23.5 cm lang, mit c. 3 Schaftblättern; Rachis kantig, c. 13.5—30 cm lang. Brakteen schmal lanzettlich, allmählich zugespitzt, bis c. 2—2.75 cm lang, 0.4 0 5 cm breit. Blüten bis c 22, abstehend, blassgrün mit abstehenden paarigen Sepalen. Unpaares Sepalum lanzettlich, stumpf, konvex, 5nervig, c. 1.85 cm lang, 0.55 cm breit. Paarige Sepalen am

Säulenfuss herablaufend, divergierend, mit zurückgebogener Spitze, schief lanzettlich, spitz, stumpfwinkelig konkav, mit 5 aussen vorragenden Nerven, c. 2 cm lang, 0.6 cm breit. Petalen vorgestreckt, mit den Rändern etwas über einander liegend, die Säule überdeckend, schief länglich, stumpf, konkav, 3nervig, mit aussen vorragender Mittelrippe, c. 1.5 cm lang, 0.6 cm breit. Lippe der Spitze des Säulenfusses mittelst eines kurzen Nagels zu einem zurückgerichteten, mit dem unteren Teil des Säulenfusses einen stumpfen Winkel darstellenden, kegeligen, stumpfen, c. 0.175 cm langen Sporn angewachsen, zurückgekrümmt, konkav, länglich, schwach dreilappig, innen im unteren Teile mit 5 parallelen Längsrippen, blassgrünlich, in der Mitte hellgelb, ausgespreizt c. 1.75 cm lang, über die Seitenlappen 0.8 cm breit. Seitenlappen aufrecht, konkav, kurz, breit abgerundet; Mittellappen viereckig, abgerundet, wellig, konkav, c. 0.66 cm lang, 0.675 cm breit. Säule ziemlich lang, schwach gebogen, gegen die Basis nicht verbreitert, mit abgerundet dreieckig vorgezogener Spitze. c. 0.68 cm lang. Anthere verkehrt dreieckig, an der Spitze breit abgestutzt, ausgerandet und mit 2 sehr kleinen Läppchen im Sinus, das Konnektiv gegen die Basis in ein 3lappiges, verbreitertes Queranhängsel vorgezogen, die Läppchen stumpf und gleich lang, c, 0.23 cm breit. Pollinien 2, dreieckig, hinten mit einer Querspalte, gelb, mit dem eirund dreieckigen Stielchen und der kurzen, querverbreiterten Klebmasse c. 0.15 cm lang. Narbe gross, halboval. Säulenfuss mit der Säule einen rechten Winkel bildend, gerade, länglich, rinnig. aussen 5rippig, dickfleischig, an der Spitze zusammengezogen, stumpfwinkelig zurückgebogen und dem Nagel der Lippe angewachsen, c. 0.6 cm lang. Ovarium mit Stielchen c. 1.7 cm lang, 6furchig.

Oberonia cirrhifera J. J. S. n. sp.

Planta parva. Caules approximati, elongati, vix flexuosi, compressi, ensiformes, c. 4.5 cm. longi, 0.2 cm. lati, laxe c. 8folii. Folia patentia, inarticulata, lateraliter compressa, linearia, acuta vel obtusiuscula et apiculata, inferne breviter fissa et basi compresso-tubulosa, carnosula, inferiora ad vaginam reducta, tota ad c. 3 cm. longa, 0,25 cm. lata. Inflorescentia laxe multiflora, folia superans, pedunculo c. 1 cm. longo, vaginulam 1 bracteiformem gerente, rachide angulata, glabra, c. 3.75 cm. longa. Bracteae e basi orbiculari-ovata ad quinquangulari subulato-acuminatae, concavae, irregulariter marginatae, c. 0.1 cm. longae. Flores vix verticillati, superiores laxiores, patentes, parvi, c. 0.2 cm. lati. Sepalum dorsale patentissimum, ovatum, concavum, c. 0.08 cm. longum, bene 0.05 cm. latum. Sepala lateralia valde reflexa, superne incurva, cucullato-concava, basi intus convexa, oblique ovata, acuta, c. 0.08 cm. longa, 0.07 cm. lata. Petala incurva, oblique elliptica, obtusa, concava, erosa, c. 0.075 cm. longa, 0.04 cm. lata. Labellum 3lobum, basi latum utrinque rotundatum concavum et fovea transversa subsemiorbiculari margine elevata donatum, subtus convexum, totum explanatum c. 0,15 cm., usque ad apicem loborum lateralium 0.08 cm. longum, basi 0.125 cm. latum; lobi laterales divergentes, e basi oblique triangula subulato-acuminati, parte libera 0.04 cm. longi; lobus intermedius porrectus, laterales longe superans, quam hypochylium angustior, ultra medium bifidus, totus inexplanatus c. 0.08 cm. longus, parte inferiore subovato-quadrangula, fere 0.05 cm. longa et lata, laciniis divergentibus, elongatis, subulato-filiformibus, tortuosis, explanatis c. 0.1 cm. longis, denticulo interposito. Gynostemium breve, a dorso compressum, basi leviter contractum, dorso convexum, latius quam longum, c. 0.04 cm. longum, clinandrio transverso, auriculis obtusis, concavis. Anthera cucullata, transverse ovalis cum lobulo apicali obtuso, basi truncata. Stigma transversum, angustum. Ovarium pedicellatum glabrum, c. 0.08 cm. longum.

Java: Priangan, Goenoeng Karang bei Tjibeber in c. 1100 m ü. d. M. (W. F. WINCKEL, bl. im September 1917, kult. unter n. 371).

Die Pflanze ist offenbar nahe verwandt mit *O. caudata* KING von Perak. Nach der Beschreibung unterscheidet sie sich durch schmälere Blätter, einen verhältnismässig längeren Blütenstand, eingebogene, elliptische, nicht zugespitzte, ausgefressene Petalen.

Beschreibung nach einem in Formalin konservierten Exemplar.

Oberonia cirrhifera J. J. S.

Kleine Pflanze. Stengel dicht beisammen, verlängert, kaum hin und her gebogen, zusammengedrückt, schwertförmig, c. 4.5 cm lang, 0.2 cm breit, locker c. 8blättrig, von welchen die unteren ohne Spreite. Blätter abstehend, ungegliedert, linear, spitz oder stumpflich mit einem Spitzchen, nach unten kurz scheideförmig gespalten und am Grunde röhrig und zusammengedrückt, dünnfleischig, bis c. 3 cm lang, 0.25 cm breit. Blütenstand locker vielblütig, länger als die Blätter; Pedunculus c. 1 cm lang, mit einem brakteeförmigen Schaftblatt; Rachis kantig, kahl, c. 3.75 cm. lang. Brakteen aus rundlich eirunder bis fünfeckiger Basis pfriemlich zugespitzt, konkav, unregelmässig berandet, c. 0.1 cm lang. Blüten kaum quirlig, die höchsten lockerer gestellt, abstehend, klein, c. 0.2 cm breit. Unpaares Sepalum weit abstehend, eirund, spitz, konkav, c. 0.08 cm lang, 0.05 cm breit. Paarige Sepalen zurückgeschlagen, nach oben eingebogen, kappig konkav, schief eirund, spitz, c. 0.08 cm lang, 0.07 cm breit. Petalen eingebogen, schief elliptisch, stumpf, konkav, ausgefressen, c. 0.075 cm lang, 0.04 cm breit. Lippe 3lappig, mit breiter, beiderseits abgerundeter, konkaver Basis und mit einem ungefähr halbrunden, am Rande erhabenen Nektarium, unten konvex, ausgespreizt c. 0.15 cm, bis an die Spitze der Seitenlappen 0.08 cm lang, an der Basis 0.125 cm breit; Seitenlappen divergierend, aus schief dreieckiger Basis zugespitzt, der freie Teil 0.04 cm lang; Mittellappen vorgestreckt, viel länger als die Seitenlappen, schmäler als das Hypochyl, vorbei der Mitte 2spaltig, unausgespreizt c. 0.08 cm lang, der untere Teil eirund viereckig, c. 0.05 cm lang und breit, die Lazinien divergierend, pfriemlich fadenförmig, gewunden, ausgespreizt c. 0.1 cm lang, mit einem Zähnchen im Sinus. Säule kurz, vom Rücken

zusammengedrückt, am Grunde etwas zusammengezogen, mit konvexem Rücken, breiter als lang, c. 0.04 cm lang; Clinandrium quer; Öhrchen stumpf, konkav. Anthere kappig, queroval, an der Spitze in ein stumpfes Läppchen vorgezogen, an der Basis abgestutzt. Narbe quer, schmal. Ovarium mit dem Stielchen kahl, c. 0.08 cm lang.

* **Oberonia microphylla** LNDL. Gen et sp. Orch. (1830), 17; MIQ. Fl. Ind. Bat. III (1855), 624; J. J. S. in Fl. Buit. VI, Orch. (1905), 235; Atlas Fig. CLXX.—*Malaxis microphylla* BL. Bijdr. (1825), 395; RCHB. F. in WALP. Ann. VI (1861), 215.—*Iridorchis microphylla* O. K. Rev. gen. pl. II (1891), 669.

Rhizoma repens, bene ramosum, teres. Caules c. 0.25—0.3 cm. distantes, breviusculi, erecti, compressi, serpentini, c. 3.5—6 cm. longi, c. 5folii. Folia erecto-patentia, inarticulata, lateraliter compressa, elongato-linearia, plerumque plus minusve falcato-incurva, acutissima, basi vaginato-fissa et late sicco-membranaceo-marginata, lateribus convexa, carnosula, viridia, superiora maxima, summum minus, maxima tota c. 9—10 cm. longa, 0.35—0.6 cm. lata; vagina 2—2.4 cm. longa. Inflorescentia laxe multiflora, folia subaequans vel paulum superans, pedunculo magnam partem vagina folii summi incluso, pallide fuscescenti, c. 1.25—2 cm. longo, nonnullis vaginulis in bracteas vergentibus adpressis donato, rachide 7—8costata, dilute fusco-viridi, c. 2.5—7.75 cm. longa. Bracteae pedicello adpressae, rhombeae ad oblongae, sensim longius acuminatae, erosae, concavae, pallide fuscescentes, c. 0.2—0.25 cm. longae. Flores plus minusve in verticillos 7—8meros dispositi, superiores plus minusve alterni, patentissimi, dilute fusci, labello obscuriore, c. 0.2 cm. lati. Sepalum dorsale ovato-ellipticum, anguste obtusum, c. 0.12 cm. longum, c. 0.75 cm. latum. Sepala lateralia oblique elliptico-ovata, acutiuscula, convexa, c. 0.13 cm longa, 0.07 cm. lata. Petala cuneato-rhombea, obtusa, $^3/_5$ partibus superioribus lacerata, leviter concava, c. 0.1—0.12 cm. longa, 0.06—0.075 cm. lata. Labellum 3lobum, nectario parvulo ad basin, subtus convexum, explanatum totum bene 0.1 cm. longum, ad lobos laterales 0.1 cm. latum, lobis lateralibus erectis, gynostemium amplectentibus, obverse triangulis vel subtrapeziformibus, basi contractis, saepe angulo antico obtusis, angulo postico anguste obtusis vel subacutis, c. 0.05 cm. longis, lobo intermedio majore, cuneato-subobcordato, breviter obtuse bilobulo, sinu lato, c. 0.06 cm. longo, basi 0.03 cm., superne bene 0.05 cm. lato. Gynostemium brevissimum, a dorso compressum, apice paulo dilatatum, obscurius coloratum, clinandrio transverso, concavo. Anthera cucullata, transverse ovalis, fuscescens. Pollinia in corpuscula 2 subobovata, unita, flavescentia. Rostellum recurvulum, obtusum. Stigma transversum. Ovarium fuscum, cum pedicello pallide fusco teres, nitidulum, c. 0.14 cm. longum. Capsula patentissima, breviter pedicellata, flore marcido coronata, fructum *Begoniae* simulans, alato-trigona, alis erosa, lateribus costa longitudinali instructa, c. 0.35 cm. longa, 0.23—0.3 cm. lata, pedicello c. 0.075 cm. longo.

Java: Batavia, Buitenzorg, auf dem Salak; stellenweise viel. (BLUME, R. C. BAKHUIZEN VAN DEN BRINK, bl. im April 1918).

Priangan, auf dem Galoenggoeng oberhalb Singaparna, in 800 m ü. d.M.;

hier und da viel. (C. A. BACKER n. 8618, bl. und fr. im August 1913). Ebenda, Soemedang, auf dem Hariang. (J. C. VAN HASSELT). Ebenda, bei Indihiang, in 450 m ü. d. M., ziemlich häufig, in dichten Büscheln herabhängend, (C. A. BACKER, bl. und fr. im August 1913).

Banjoemas, auf dem Slamat am Südhang oberhalb Batoe Raden, in 1000 m ü. d. M. (C. A. BACKER n. 2257, bl. und fr. im April 1911).

Besoeki, auf dem Idjen, in c. 1000 m ü. d. M. (H. ZOLLINGER).

Bemerkenswert ist das deutlich kriechende Rhizom.

Nach Herrn BACKER werden die Blütenstände wie auch *Lycopodium* in Indihiang durch die Bevölkerung im Kopfhaar getragen, damit es nicht ausfälle.

Beschreibung nach lebenden, vom Salak stammenden Exemplaren.

Oberonia indragiriensis SCHLTR. in Bull. Herb. BOISS. 2e série, VI (1906), 306.

*var **javanica** J. J. S. var.

Caules approximati, abbreviati, c. 3folii et basi vaginis c. 4 basin versus decrescentibus tecti, radicibus tenuibus. Folia erecto-patentia, articulata, decidua?, lateraliter compressa, oblique lineari-lanceolata, acuta, basi supra vaginato-fissa, utrinque convexa, crassiuscule carnosa, opaca, dilute viridia, mediana maxima, ad c. 8.5 cm. longa, 1.2 cm. lata; vagina brevis, lateraliter compressa. Inflorescentia folia superans, glabra, laxius multiflora, c. 0.3 cm. diam., pedunculo dilute viridi, c. 3.5 cm. longo, nonnullis vaginulis minutis adpressis triangulis donato, rachide arcuata, crassiuscula, angulato-tereti, dilute viridi, c. 12.5 cm. longa, c. 0.26 cm. diam. Bracteae basi concava ovario adpressae, supra basin obtusangule recurvae et sepalo dorsali adpressae, triangulae, laceratae, pallide virescentes, c. 0.15 cm. longae, bene 0.1 cm. latae. Flores minimi, in excavationes rachidis inserti, labello rachidi adpressi, flavescentes, deinde flavi vix brunnescentes, c. 0.14 cm. lati, 0.17 cm. longi, sepalis petalisque intus ad basin papillosis. Sepalum dorsale reflexum, convexum, late triangulum, obtusum, c. 0.07 cm. longum, 0.06 cm. latum. Sepala lateralia suboblique ovato-triangula (semielliptica), acuta, concava, c. 0.07 cm. longa, 0.05 cm. lata. Petala minora, reflexa, convexa, apice incurvula, oblique triangula, subfalcata, anguste obtusa, vix irregulariter marginata. Labellum latum, subtrilobum, ambitu late triangulum, flavescens, fovea majuscula semiorbiculari, dilute viridi, costula transversa ad basin, explanatum c. 0.075 cm. longum, fere 0.1 cm. latum, lobis lateralibus patentissimis, laceratis lobo intermedio triangulo, rotundato, integro. Gynostemium brevissimum, a dorso compressum, dorso convexum, dilute viride, clinandrio excavato, transverso, aequilateraliter trapeziformi. Anthera parva, transverse ovalis, apice obtusangula, alba, c. 0.025 cm. lata. Pollinia 4, in corpuscula 2 pyriformia unita, pallide aurantiaca. Stigma clinandrium aequans, semiorbiculare, concavum. Ovarium brevissimum, crassum, dilute viride, c. 0.07 cm. longum.

Java: Batavia, Buitenzorg, Tjiomas. (R. C. BAKHUIZEN VAN DEN BRINK, bl. im April 1920).

Die Pflanze stimmt nach der Beschreibung und in der Form der Lippe nach der Skizze so gut mit der von Sumatra stammenden SCHLECHTERschen Art überein, dass ich nicht glaube, dass sie spezifisch verschieden ist. Die Unterschiede finden sich hauptsächlich in den breiteren Petalen und den längeren und weniger zahlreichen Lazinien der Lippe. SCHLECHTER erwähnt nicht die Papillen an der Basis der Sepalen und Petalen. Ich habe kein Original der SCHLECHTERschen Pflanze gesehen.

Bei einem kleinen, aber schon blühenden Exemplar trug der Stengel 6 Blätter.

Beschreibing nach einem lebenden Exemplar.

Oberonia indragiriensis SCHLTR. var. *javanica* J. J. S.

Stengel sehr kurz, c. 3blättrig. Blätter aufrecht abstehend, schief linear lanzettlich, spitz, beiderseits konvex, ziemlich dickfleischig, matt hellgrün, das mittlere am grössten, bis c. 8.5 cm lang, 1.2 cm breit; Scheide kurz. Blütenstand länger als die Blätter, umgebogen, kahl, ziemlich locker vielblütig, mit den Blüten c. 0.3 cm im Durchmesser; Pedunculus c. 3.5 cm lang, mit einigen kleinen, angedrückten, dreieckigen Schaftblättern; Rachis ziemlich dick, kantig, mit zahlreichen kleinen Aushöhlungen, c. 12.5 cm lang. Brakteen mit konkavem Grunde dem Ovarium anliegend, über der Basis stumpfwinkelig zurückgebogen und dem unpaaren Sepalum anliegend, dreieckig, geschlitzt, grünlich, c. 0.15 cm lang, 0.1 cm breit. Blüten sehr klein, in die Aushöhlungen der Rachis eingesenkt, mit der Lippe der Rachis anliegend, gelblich, nachher mehr gelb, kaum etwas bräunlich, c. 0.14 cm breit, 0.17 cm lang, die Sepalen und Petalen innen am Grunde papillös. Unpaares Sepalum konvex, breit dreieckig, 0.07 cm lang, 0.06 cm breit. Paarige Sepalen eirund dreieckig, spitz, konkav, 0.07 cm lang, 0.05 cm breit. Petalen kleiner, zurückgeschlagen, konvex, schief dreieckig, kaum etwas unregelmässig berandet. Lippe breit, schwach dreilappig, im Umriss breit dreieckig, gelblich, mit einer ziemlich grossen, halbrunden, grünen Aushöhlung und mit einem Querrippchen am Grunde, ausgespreizt c. 0.075 cm lang, fast 0.1 cm breit; Seitenlappen weit abstehend, zerfetzt; Mittellappen dreieckig, abgerundet, ganz. Säule sehr kurz, vom Rücken zusammengedrückt, mit konvexem Rücken, hellgrün; Clinandrium ausgehöhlt, quer, trapezienförmig. Anthere klein, queroval, stumpf, weiss, c. 0.025 cm breit. Pollinien 4, zu 2 birnförmigen Körperchen vereinigt, blassorange. Narbe dem Clinandrium gleich kommend, halbrund, konkav. Ovarium sehr kurz, dick, hellgrün, 0.07 cm. lang.

* **Oberonia tjisokanensis** J. J. S. n. sp.

Caules approximati, abbreviati, compressi, c. 6foliati, basi nonnullis vaginis donati. Folia articulata, pendula, flaccida, erecto-patentia, elongata, lateraliter compressa, linearia, saepe plus minusve falcatula, apicem versus sensim angustata, acutissima, basi supra vaginato-fissa, carnosula, opaca, subglauco-viridia, mediana maxima, ad c. 35 cm. longa, 1.2 cm. lata; vaginae initio tubulosae, valde lateraliter compressae, mox antice rumpentes et irregulariter membranaceo-marginatae, colore foliorum, ad c. 4 cm.

longae. Inflorescentia foliis brevior, dense multiflora, cylindrica, c. 0.6--0.65 cm. diam., pedunculo compresso, pallide viridi, c. 5.5 cm. longo, inferne plerumque vaginula foliacea articulata superne vaginulis bracteiformibus donato, rachide interrupte multicostata, glabra, pallide viridi, c. 11 cm. longa. Bracteae ovato-lanceolatae, acutae, obsolete erosulae, glabrae, c. 0.23 cm. longae. Flores minimi, patentes, sepalis reflexis, semipellucide albidis. Sepalum dorsale late ovatum, obtusum, convexum, bene 0.08 cm. longum, 0.07 cm. latum. Sepala lateralia oblique ovata, acutiuscula, convexa, bene 0.1 cm. longa, 0.075 cm. lata. Petala patentia, oblongo-obovata, obtusa, irregulariter marginata, semipellucida, pallide aurantiaca, inferne pallida, fere 0.1 cm. longa, 0.05 cm lata. Labellum 3lobum, fovea semiorbiculari elevato-marginata ad basin, explanatum c. 0.15 cm. longum, ad lobos laterales fere aequilatum; lobi laterales conspicui, erecti, gynostemium amplectentes, e basi subcontracta oblique ovato- vel obovato-quadranguli, obtusi vel obtusissimi, subfalcatuli, leviter concavi, extus convexi, c. 0.06 cm. longi; lobus intermedius ex ungue brevi vel breviusculo transverse quadrangulo transverse ovali dilatatus, apice in lobulum parvum obtusum productus vel plus minusve 3lobulus vel grossius paucicrenatus, flavo-aurantiacus, basi pallidus, c. 0.08 cm. longus, basi c. 0.06--0.07 cm., superne 0.1--0.125 cm. latus. Gynostemium brevissimum, virescenti-album, c. 0.03 cm. longum, clinandrio transverse ovali. Anthera cucullata, abbreviato-ovata, obtusa, c. 0.03 cm. lata. Pollinia 4, in corpuscula 2 obovata unita, nitida, semipellucida, pallide flava. Rostellum brevissimum, triangulum. Stigma transverse ovale. Ovarium 6sulcatum, pallide viride, cum pedicello albido rectum, glabrum, semipellucidum, c. 0.2 cm. longum.

Java: Priangan. Tjisokan bei Tjibeber in c. 750 m ü. d. M. (W. F. WINCKEL, im September 1917, kult. unter n. 379).

Bali: Goenoeng Pala, in c. 620 m d. ü. M. (Exp. R. MAIER, SARIP n. 303, bl. und fr. im September 1918).

Unter den javanischen Arten steht diese *O. dubia* J. J. S. und *O. similis* LNDL. am nächsten, ist jedoch verschieden durch die langen, schmalen Blätter, kaum ausgefressenen Brakteen, anders gefärbten Blüten, eine anders gestaltete Lippe. Die Form der Lippe, besonders des Mittellappens, scheint ziemlich variabel zu sein; der Nagel ist länger oder kürzer, die Platte queroval mit einem stumpfen Spitzchen, oder eingedrückt 2lappig mit einem stumpfen Läppchen im Sinus, oder auch in der oberen Hälfte grob gekerbt.

Oberonia tjisokanensis J. J. S.

Stengel genähert, sehr kurz, zusammengedrückt, c. 6blättrig, am Grunde mit wenigen Scheiden. Blätter gegliedert, verlängert, seitlich züsammongedrückt, hängend, schlaff, aufrecht abstehend, linear, meistens mehr oder weniger sichelig, gegen die Spitze allmählich verschmälert, sehr spitz, dünn fleischig, matt grün, die mittleren am längsten, bis c. 35 cm lang, 1.2 cm breit; Scheiden anfangs röhrig, stark seitlich zusammengedrückt, bald vorn aufreissend und unregelmässig häutig berandet, bis c. 4 cm lang Blütenstand kürzer als die

Blätter, zylindrisch, dicht vielblütig, c.0.6—0.65 cm im Durchmesser; Pedunculus zusammengedrückt, c 5.5 cm lang, am unteren Teil meistens mit einem blattartigen, gegliederten und nach oben mehreren brakteeförmigen Schaftblättern; Rachis unterbrochen vielrippig, kahl, blassgrün, c. 11 cm lang. Brakteen eirund lanzettlich, spitz, sehr schwach ausgefressen, kahl, c. 0.23 cm lang. Blüten sehr klein, abstehend, mit zurückgeschlagenen, halbdurchscheinenden, weisslichen Sepalen. Unpaares Sepalum breit eirund, stumpf, konvex, c. 0.08 cm lang, 0.7 cm breit. Paarige Sepalen schief eirund, spitzlich, konvex, c. 0.1 cm lang 0.075 cm breit. Petalen abstehend, länglich verkehrt eirund, stumpf, unregelmässig berandet, halbdurchscheinend, nach unten blass, fast 0.1 cm lang, 0.05 cm breit. Lippe dreilappig, mit einer halbrunden, am Rande erhabenen Grube am Grunde, ausgespreizt c. 0.15 cm lang, über die Seitenlappen fast eben so breit; Seitenlappen aufrecht, die Säule umfassend, ziemlich gross, eirund bis verkehrt eirund viereckig, stumpf oder sehr stumpf, schwach konkav, c. 0.06 cm lang; Mittellappen aus kurzem oder sehr kurzem, quer viereckigem Grunde queroval verbreitert, an der Spitze in ein kurzes, stumpfes Läppchen vorgezogen oder mehr oder weniger 3lappig oder mit wenigen groben Kerbzähnen, gelborange, am Grunde blass, c. 0.08 cm lang, an der Basis 0.06—0.07 cm, oben 0.1—0.125 cm breit. Säule sehr kurz, grünlich weiss, c. 0.03 cm lang. Anthere kappig, verkürzt eirund, stumpf, 0.03 cm breit. Pollinien 4, zu 2 verkehrt eirunden Körperchen vereinigt, glänzend, halbdurchscheinend, blassgelb. Rostellum sehr kurz dreieckig. Narbe queroval. Fruchtknoten 6furchig, blassgrün, mit dem weisslichen Stielchen gerade, kahl, halbdurchscheinend, c. 0.2 cm lang.

***Microstylis humerata** J. J. S. n. sp.

Caules approximati, erecti, carnosi, virides, sordide violaceo-suffusi, basi radicantes, c. 4.5--8 cm. longi, 0.5--0.6 cm. diam. vel tenuiores, inferne nonnullis vaginis purpureo-suffusis donati, superne c. 4folii, internodiis basi apiceque obliquis. Folia patentia, oblique ovato-oblonga ad lanceolata, sensim acuminata, acuta, nervis 5 supra sulcatis subtus carinatis, herbacea, viridia, subtus paulo pallidiora, c. 8--11 cm longa, 2.8--3.2 cm lata; petiolus brevis, latus, canaliculatus, 5carinatus, carinis purpureo-suffusus, cum vagina tubulosa angulata ad c. 3 5 cm. longus. Inflorescentia erecta, laxe multiflora, pedunculo anguste alato-angulato, violaceo, evaginulato, c. 4.25 cm. longo, rachide pedunculo simili, 7.5 cm. superante. Bracteae reflexae, lanceolato-triangulae, acutae, violaceae cum costa media pallida, ad c. 0.425 cm. longae. Flores parvi, patentissimi, violaceo-purpurei, c. 0.4 cm. lati, 0.6 cm. longi. Sepalum dorsale deorsum spectans, subovato-oblongum, apice oblique recurvum, obtusum, valde convexum, nervis 3 tenuibus albidis, praesertim dorso nitidulum, c. 0.325 cm. longum, 0.175 cm. latum. Sepala lateralia erecta, divergentia, plus minusve reflexa, oblique ovata, obtusa, valde convexa, nervis 3 tenuibus albidis, bene 0.3 cm. longa, 0 2 cm. lata. Petata divergentia, sublinearia, obtusa, valde convexa, nervo 1 albido, c. 0.34 cm. longa, 0.075 cm. lata. Labellum late hippocrepidiforme, antice trilobum, fovea longitudinali oblonga alte concava marginibus elevata subtus valde convexa in basi lobi intermedii terminante, in utraque foveae parte concavum, violaceo-purpureum, nervo curvato albido utrinque, c. 0.43 cm. longum, 0.4 cm. latum, lobo intermedio producto, lobos laterales valde superante, ovato, obtusiusculo, marginibus incurvulo, sinibus duplicato-obtusangulis a lobis lateralibus separato, c. 0.15 cm. longo et fere aequilato, lobis lateralibus late angulato-rotundatis, auriculis remotis, oblique triangulis, obtusis, convexis, c. 0.2 cm. longis. Gynostemium cum ovario angulum obtusum vel subrectum faciens, a dorso compressum, medio obtusangule incurvulum, ambitu oblongo-quadrangulum, apicem versus dilatatum, albidum, dimidio superiore dilute viride, c 0.15 cm. longum, auriculis leviter divergentibus, oblique oblongis, obtusis. Anthera plane cucullata, transverse subreniformis, apice truncata, connectivo dilute viridis, margine alba, fere 0.05 cm. lata. Pollinia 4, in corpuscula 2 a dorso compressa oblique obovata unita, flava, semipellucida, c. 0.03 cm. longa. Ovarium pedicellatum supra medium obtusangule curvatum, pallide virescens, inferne pallide purpurascens, costis 6 purpureis, c. 0.35 cm. longum.

Java: Priangan, Umgebung von Tjidadap bei Tjibeber in c. 1000 m ü. d. M. (Kult. in Hort. R. C. BAKHUIZEN VAN DEN BRINK, Buitenzorg, 1918).

Die Art ist von den Verwandten leicht zu unterkennen durch die breiten Ausschnitte, welche die Mittel- und Seitenlappen der Lippe trennen. Der eiförmige Mittellappen überragt die breit eckig abgerundeten Seitenlappen weit.

Die Beschreibung wurde angefertigt nach einem im Garten von Herrn BAKHUIZEN VAN DEN BRINK zur Blüte gelangten Exemplar.

Microstylis humerata J. J. S.

Stengel aufrecht, fleischig, grün, violett angelaufen, 4.5—8 cm lang, 0.5—0.6 cm dick oder dünner, am unteren Teile mit Scheiden, nach oben c. 4blättrig, mit schiefen Internodien. Blätter abstehend, schief eiförmig länglich bis lanzettlich, allmählich zugespitzt, spitz, mit 5 oben gefurchten, unten gekielten Nerven, grün, c. 8—11 cm lang, 2.8—3.2 cm breit; Stiel kurz, breit rinnig, 5kielig, auf den Kielen purpurn angelaufen, mit der röhrigen, kantigen Scheide c. 3.5 cm lang. Blütenstand aufrecht, locker vielblütig; Pedunculus schmal flügelig kantig, violett, ohne Schaftblättern, c. 4.25 cm lang; Rachis länger als 7.5 cm. Brakteen zurückgeschlagen, lanzettlich dreieckig, violett mit blassem Mittelnerv, bis c. 0.425 cm lang. Blüten klein, weit abstehend, violettpurpurn, c. 0.4 cm breit, 0.6 cm lang. Unpaares Sepalum schwach eirund länglich, stumpf, konvex, mit 3 weisslichen Nerven, c. 0.325 cm lang, 0.175 cm breit. Paarige Sepalen divergierend, schief eirund, stumpf, sehr konvex, mit 3 blassen Nerven, c. 0.3 cm lang, 0.2 cm breit. Petalen divergierend, nahezu linear, stumpf, sehr konvex, mit 1 blassen Nerv, c. 0.34 cm lang, 0.075 cm breit. Lippe breit hufeisenförmig, vorn 3lappig, mit länglicher, stark konkaver, am Rande erhabener, unten konvexer, bis auf die Basis des Mittellappens reichender Grube, violettpurpurn, c. 0.43 cm lang, 0.4 cm breit; Mittellappen die Seitenlappen weit überragend und von diesen durch doppelt stumpfwinkelige Ausschnitte getrennt, eirund, stumpflich, c. 0.15 cm lang und breit; Seitenlappen breit, eckig abgrundet; Öhrchen entfernt, schief dreieckig, stumpf, konvex, c. 0.2 cm lang. Säule mit dem Ovarium einen stumpfen oder fast rechten Winkel bildend, vom Rücken zusammengedrückt, in der Mitte stumpfwinkelig eingebogen, länglich vieeckig, nach vorne etwas verbreitert, weiss, nach oben hellgrün, c. 0.15 cm lang, mit länglichen, stumpfen Öhrchen. Anthere flach kappig, nierenförmig, an der Spitze abgestutzt, weiss mit hellgrünem Konnektiv, fast 0.05 cm breit. Pollinien 4, zu 2 verkehrt eirunden, niedergedrückten Körperchen vereinigt, gelb, durchscheinend, 0.03 cm lang. Ovarium mit dem Stielchen c. 0.35 cm lang, über der Mitte stumpfwinkelig gebogen, grünlich, gegen die Basis purpurrötlich, mit 6 purpurnen Rippen.

Liparis viridiflora LNDL. Gen. et sp. Orch. (1830), 31; etc.--*L. longipes* AMES Orch. VI (1920) 94.

Die von OAKES AMES l. c. als *L. longipes* LNDL. aufgeführte Art ist sicher *L. viridiflora* LNDL. Wahrscheinlich ist *L. longipes* LNDL. überhaupt als Synonym zu *L. viridiflora* LNDL. zu stellen; da mir jedoch kein Material vorliegt, bin ich nicht völlig sicher davon.

AGROSTOPHYLLUM BL.

Die Zahl der bekannten javanischen Arten hat sich von 5 in 1905 auf 9 gesteigert, so dass es wünschenswert erscheint einen neuen Schlüssel zu geben.

1. Blätter klein, rechtwinkelig abstehend, bis c. 3 cm lang (Sect. *Appendiculopsis*) 2
Blätter schräg abstehend, viel länger (Sect. *Eu-Agrostophyllum*) . . . 3
2. Blattscheiden mit 2 pfriemlichen Fortsätzen. Rostellum ganz. . . . . A. *bicuspidatum* J. J. S.
Blattscheiden ohne Fortsätze . . . . A. *Hasseltii* J. J. S.
3. Lippe durch eine sehr starke Quereinschnürung an der Unterseite in 2 nahezu gleich grosse, sackige Abteilungen geteilt 4
Lippe unten nur schwach oder kaum eingeschnürt, der vordere Abschnitt meistens schwach konkav, sehr selten kaputzenförmig. 5
4. Stengel sehr dünn, ziemlich steif. Blätter 0.6--0.8 cm breit, glänzend grün. Partialblütenstände c. 4blütig. . . . . A. *tenue* J. J. S.
Stengel nicht sehr dünn, ziemlich schlaff. Blätter c. 1.1 cm breit, matt blaugrün. Partialblütenstände 1--2blütig . . . . . . A. *javanicum* Bl.
5. Vorderer Teil der Lippe stark konkav, der kurzen Säule angedrückt. Blätter c. 1.7 cm breit. . . . . A. *cyathiforme* J. J. S.
Vorderer Teil der Lippe der Säule nicht angedrückt 6
6. Blätter gegen die Spitze der Stengel allmählich dichter gestellt; Blattscheiden etwas abstehend. Blüten klein. Säule bis 0.275 cm lang, rot punktiert. . . A. *Denbergeri* J. J. S.
Blätter gegen die Spitze der Stengel nicht dichter gestellt (oder nur die allerhöchsten). Säule schlank, 0.4--0.5 cm lang, meistens mehr oder weniger rot berandet aber nicht punktiert 7
7. Blätter gross, bis 3.3 cm. breit; Scheiden abstehend. Säule überhalb der Basis etwas gekrümmt und unten eingeschnürt. . . . A. *laxum* J. J. S.

Blätter bis 2.1 cm breit; Scheiden anliegend. Säule an der Basis nicht gekrümmt, unten nahezu in der Mitte eingeschnürt. 8

8. Querlamelle zwischen den Seitenlappen abgestutzt. Mittellappen c. 0.3 cm breit. A. *longifolium* RCHB. F.

Querlamelle in der Mitte vorgezogen und abgerundet. Mittellappen 0.575 cm breit. . . . . A. *latilobum* J. J. S.

Agrostophyllum bicuspidatum J. J. S. in Ic. bog. II (1903), 55. — *A. callosum* J. J. S. (nec RCHB. F., nec RIDL.) in Fl. Buit. VI, Orch. (1905), 286; Atlas Fig, CCXIX. — *A. stipulatum* SCHLTR. (p. p.) in ENGL. Bot. Jahrb. XLV (1911), Beibl. No. 104, 22 — *Appendicula callosa* BL. Bijdr. (1825), 303; LNDL. Gen. et sp. Orch. (1833), 230; MIQ. Fl. Ind. Bat. III (1855), 704. — *Podochilus callosus* SCHLTR. (p. p.) in Mém. Herb. BOISS. No 21 (1900), 62.

Java: Banten. (BLUME).

Batavia, auf dem Salak. (BLUME). Ebenda am Tjiapoes. (J. J. SMITH, bl. im August 1909).

Priangan, auf dem Gede. (JUNGHUHN). Am Sitoegoenoeng, im Urwalde. (J. J. SMITH, bl. im April 1901) Auf dem Boerangrang in 1400 m ü. d. M., im Urwalde. (C. A. BACKER n. 14489, bl. im Juli 1914). Djampang koelon bei Tjiemas. (R. C. BAKHUIZEN VAN DEN BRINK, August 1918, steriel). Tjiandjoer, Takoka, in c. 1000 m ü. d. M. (S. H. KOORDERS n. 14929 β, fr. im Februar 1894). Tjibeber, Goenoeng Beser, in c. 1000 m ü. d. M., im Urwalde. (W. F. WINCKEL, kult unter n. 84; J. J. SMITH n. 740, im Juni 1917). Ebenda, Tjadas Malang in c. 1000 m ü. d. M., epiphytisch im Urwalde (J. J. SMITH n. 754, im Juni 1917). Tasikmalaja. (C. A. BACKER, leb. Pfl. kult. in Hort. Bog. unter n. 8).

Semarang, auf dem Oengaran, am Nordhang in c. 1200 m ü. d. M., epiphytisch im Urwalde. (W. M. DOCTERS VAN LEEUWEN n. 1254, im März 1913).

Diese Art hat eine ziemlich bewegte Geschichte. Sie wurde 1825 zuerst von BLUME als *Appendicula callosa* beschrieben und unter diesem Namen auch von LINDLEY und MIQUEL zitiert.

Unter dem nämlichen Namen wurde 1845 von GRIFFITH (in Calc. Journ. Nat. Hist. V, 362, t. 62) eine Pflanze von Penang beschrieben und abgebildet. Aus seinen Bemerkungen, die ich hier zitiere, geht aber hervor, dass er seiner Bestimmung nicht völlig sicher war. „As it agrees tolerably with BLUME'S character, I have referred it to his *A. callosa*. But it is to be regretted that such short insufficient characters should be resorted to, when such variation in form runs through so many organs. Characters should always be as prospective as possible, and with this view should express the peculiarities of each of the organs from which they can be drawn." Leider ist die Beschwerde GRIFFITHs noch stets in Kraft, und viele Autoren fahren fort die systematische Botanik mit unvollständigen und pfuscherhaften Beschreibungen zu überströmen.

Von diesem Autor wurde 1851 nochmals ein *Agrostophyllum* abgebildet (Ic. pl. as. III (1851), pl. CCCXXXV, fig. I, II), und zwar unter dem Namen *Appendicula stipulata* GRIFF. In den Notul. pl as. III, 358, wird keine Beschreibung aber nur eine Figurenerklärung gegeben, während unter der Erklärung der Fig. I angegeben wird, dass die Pflanze von Afganisthan stamme. Die Unterteile der Fig. I beziehen sich auf die Säule, während in Fig. II hauptsächlich die Blumenblätter abgebildet worden sind. Es scheint mir aber nicht unwahrscheinlich, dass die beiden Figuren zwei verschiedenen Arten angehören. In Fig. I ist der Säulenfuss länger als in Fig. II und liegt dem Ovarium fest an, während er in Fig. II mit dem Fruchtknoten einen spitzen Winkel bildet. Bemerkenswert ist es, dass die oben erwähnte Tafel in Calc. Journ. Nat. Hist. V zusammengesetzt ist aus einem blühenden Zweiglein und aus Unterteilen der beiden Figuren der Tafel CCCXXXV in Ic. pl. as.

Wie besonders aus GRIFFITHs Figuren hervorgeht, kann seine Art (oder Arten) nicht identisch sein mit BLUMEs Pflanze. Sie ist aber sehr nahe verwandt oder vielleicht, was die Fig. II der Tafel CCCXXXV anbelangt, identisch mit einer in Sumatra und Banka heimischen Art, die ich aber vorsichtshalber vorläufig als neu betrachte *(Agrostophyllum confusum* J. J. S.).

HOOKER F. (Flora Br. Ind. VI, 83) giebt *A. callosa* BL., mit *A. stipulata* GRIFF. als Synonym. Ausser der Malaiischen Halbinsel und Java giebt er auch Borneo als Fundort. Die Beschreibung hat wahrscheinlich nur Beziehung auf den Pflanzen von der Malaiischen Halbinsel.

In seiner Monographie der *Podochilinae* führt R. SCHLECHTER *A. callosa* über in *Podochilus* (in Mém. Herb. BOISSIER No. 21 (1900), 62) und zitiert ebenfalls *A. stipulata* GRIFF. als Synonym. Den von HOOKER genannten Fundorten werden noch Sumatra und Celebes hinzugefügt. Dass unter diesem Namen mehrere Arten vereinigt sind, ist sicher; weniger leicht ist es festzustellen, nach welchen dieser Arten die Beschreibung angefertigt wurde, besonders da die wichtigsten Teile, die Lippe und Säule, nur unvollständig beschrieben werden. Dass sie nicht nur auf *A. callosa* Bl. oder *A. stipulata* GRIFF. Beziehung hat, geht u. m. daraus hervor, dass die Blätter nur 0.2—0.3 cm. breit sein sollen, die Petalen stumpf, und das Rostellum dreiekig genannt werden.

1903 stellte ich (in Ic. bog. II, 55) *Appendicula callosa* BL. in die Gattung *Agrostophyllum* unter dem Namen *Agr. bicuspidatum*, da der Name *callosum* schon von REICHENBACH vergeben war, glaubte jedoch 1905 (in Fl. Buit. VI, Orch. 286) bei strenger Durchführung des Prioritätsprinzips doch den Namen *Agr. callosum* J. J. S. für die BLUMEsche Art annehmen zu müssen. Meine Beschreibung wurde nach in Buitenzorg kultivierten Exemplaren angefertigt. Das Synonym und die Fundorte wurden in Nachfolgung anderer Autoren aufgenommen.

RIDLEY hält sich 1907 (Mat. Fl. Mal. Penins. I, 197) völlig an dem von SCHLECHTER in seiner Monographie der *Podochilinae* angenommenen Standpunkt.

SCHLECHTER verwirft 1911 (in ENGL. Bot. Jahrb. XLV, Beibl. No. 104, 22) die beiden früher von mir für die BLUMEsche Art angenommenen

Namen *Agr. callosum* J. J. S. und *Agr. bicuspidatum* J.J.S. und ersetzt sie, in der Meinung, dass *App. callosa* BL. und *App. stipulata* GRIFF. indentisch seien, durch den Namen *Agr. stipulatum* SCHLTR.

Da *Appendicula stipulata* GRIFF. nicht identisch ist mit *Appendicula callosa* BL. und das Epitheton *callosus* schon von REICHENBACH. F. benutzt wurde, ist *Agrostophyllum bicuspidatum* J.J.S. der älteste gültige Name für die BLUMEsche Art.

GRIFFITHs Pflanze(n), die vorläufig wohl am besten als *Agr. stipulatum* (GRIFF.) SCHLTR. p. p. anzudeuten ist, unterscheidet sich von der javanischen Art durch den anders gestalteten Callus der Lippe und die Form der Säule.

* **Agrostophyllum longifolium** RCHB. F. in Bonpl. V (1857), 41 (nec J. J. S.).— *Appendicula longifolia* BL. Bijdr. (1825), 304; LNDL. Gen. et sp. Orch. (1833), 230; MIQ. Fl. Ind. Bat. III (1855), 704.

Caules numerosi, approximati, erecti ad patentes, elongati, valde compressi, sectione transversa anguste elliptici, apicem versus paululum dilatati, dilute virides, plerumque 40—60 cm. longi vel etiam longiores, medio c. 0.7—1 cm., cum vaginis foliorum 1—1.15 cm. latis, apice infra inflorescentiam 1—1.2 cm., cum vaginis 1.25—1.4 cm. lati, omnino vaginis foliorum obtecti, internodiis c. 2—4 cm. longis, ultimis brevioribus. Folia numerosa, patentia, basi semitorta, loriformia, apicem versus paulum angustata, satis conspicue 2dentata, dentibus subaequalibus, oblique triangulis, falcato-incurvulis, acutis, saepe plus minusve mucronatis cum mucrone plus minusve conspicuo tenui interposito, basi paulum angustata, margine recurvula, costa media supra sulcata subtus prominente, papyracea, utrinque nitide viridia, c. 14—21 cm. longa, 1.7—2.1 cm. lata, inferiora et ultima paulo minora; vaginae internodiis multo longiores, adpressae, tubulosae, lateraliter compressae, antice rumpentes, margine exarescentes et nigrescentes, apice basi laminae latiores et utrinque dente instructae, nitidule virides. Inflorescentia terminalis, capituliformis, nutans, convexa, densissime multiflora, c. 2.2—3.3 cm. diam., vaginis magnis initio conduplicatis obtusis dilute viridibus suffulta. Inflorescentiae partiales c. 4—5florae, pedunculis c. 0.4 cm. longis, omnino vaginulis imbricantibus obtusis basi tubulosis superne accrescentibus pallidis obtectis. Bracteae adpressae, concavae, obtusae, basi tubulosae. ovarium aequantes, c. 0.9 cm. longae. Flores c. 0.7 cm. lati, sepalis petalisque pallide ochrascentibus. Sepalum dorsale incurvum, concavum, ovato-triangulum, anguste obtusum minute apiculatum, c. 0.4 cm. longum, 0.24 cm. latum. Sepala lateralia basi margine antico brevissime connata, oblique ovata, subulato-apiculata, concava, carinata, c. 0.45 cm. longa, 0.26 cm. lata. Petala recurva, e basi oblique subovata longius anguste contracta, anguste obtusa, convexa, c. 0.36—0.375 cm. longa, 0.14—0.175 cm lata. Labellum porrectum, gynostemio subparallelum, 3lobum, basi saccatum, gynostemio vix brevius, subtus longitudinaliter sulcatum, fere 0.5 cm. longum, hypochylio rotundato, 5nervio, pallide flavescenti, c. 0.16 cm. lato; lobi laterales erecti, basi gynostemii utrinque adpressi, rotundato-trianguli, antice lamella transversa quadrangula truncata levissime excisa et vix irregulariter marginata antice concava atropurpureo-

marginata conjuncti; lobus intermedius porrectus, recurvulus, abbreviato-ovatus, vix acuminatus, subacutus, basi brevissime contractus, leviter concavus, intus incrassationibus 2 conspicuis convexis cum costula longitudinali interposita donatus, albus, c. 0.25 cm. longus, 0.3 cm. latus. Gynostemium longiusculum, vix curvulum, subtus paulum infra medium constrictum, infra constrictionem convexum, basin versus subplanum, pallide flavescens, nitidulum, parte superiore margine utrinque leviter rotundatum et atropurpureo-marginatum, dorso c. 0.4 cm., subtus 0.5 cm. longum, clinandrio concavo, triangulo, margine suberosulo, apice late triangulo, obtuso, auriculis dentiformibus. Anthera cucullata, transverse subovalis, obtusa, fere 0.1 cm. lata. Pollinia 8, clavata, dilute flava, cum glandula parva brunnea fere 0.07 cm. longa. Rostellum bidentatum. Stigma ovato-urceolatum, margine inferiore in lamellam patentissimam transverse quadrangulam truncatam carnosulam apice vix purpureo-suffusam auctum. Ovarium obtuse trigonum, 6sulcatum, apice obliquum, albescens, c. 0.9 cm. longum.

Java: Banten, zwischen Bajak und Langkop, in 600 m ü. d. M., 1 Exemplar. (C. A. BACKER n. 1648, bl. im Juni 1911).

Batavia, Buitenzorg, Kampong Tjibeureum, viele Exemplare auf *Arenga*. (H. HALLIER n. 613, bl. im Dezember 1894). Goenoeng Soenarari in 900—1000 m ü. d. M., im Urwalde, nicht selten. (C. A. BACKER n. 6341, bl. im Januar 1913). Nirmala, in 950 m ü. d. M., auf einem Felsblock in der Tjikandi. (C. A. BACKER n. 11037, bl. im Dezember 1913). Krawang, Wanajasa auf dem Boerangrang in 600 m ü. d. M., in einem Kampongwäldchen auf *Arenga*, mehrere Exemplare. (C. A. BACKER n. 14292, bl. im Juni 1914).

Priangan, Tjidadap bei Tjibeber in 1000 m ü. d. M. (R. C. BAKHUIZEN VAN DEN BRINK, bl. im Februar 1916; W. F. WINCKEL, bl. im September 1917; leb. Pfl. kult. in Hort. J. J. SMITH). Ebenda, Simpang, in 1000 m ü. d. M.; viel. (R. C. BAKHUIZEN VAN DEN BRINK n. 341, bl. im Februar 1916). Auf dem Galoenggoeng in c. 1200 m ü. d. M., im Urwalde. (W. M. DOCTERS VAN LEEUWEN n. 3059, bl. im November 1918).

Tegal, auf dem Slamat (?) (C. A. BACKER, leb. Pfl. kult. in Hort. Bog.).

Diese Pflanze halte ich für *A. longifolium* RCHB. F. Sie stimmt gut überein mit einem von dem Salak stammenden, BLUMEschen Exemplar mit einem Blütenstand aber ohne Blüten im Buitenzorger Herbarium. Ob vielleicht unter den BLUMEschen Exemplaren in Leiden mehrere Arten versteckt sind, weiss ich nicht.

Nachdem die obenstehende Bemerkung geschrieben war, erhielt ich vom Leidener Herbarium einen Bogen mit dem Namen *A. longifolinm* RCHB F. aus BLUMEs Herbarium leihweise zugeschickt. Es sind hier vier Zweige aufgeklebt, von welchen zwei wirklich die Art sind, wie ich sie umschrieben habe, die beiden anderen jedoch *A. Denbergeri* J. J. S. angehören.

Agrostophyllum longifolium RCHB. F.

Stengel zahlreich, dicht beisammen, aufrecht bis abstehend, verlängert, gerade, stark zusammengedrückt, gegen die Spitze etwas verbreitert, hellgrün, c 45--60 cm, im Schatten bisweilen über 1 m lang, in der Mitte c. 0.7--1 cm, mit den Scheiden c. 1--1.15 cm breit, völlig von den Blattscheiden bedeckt, die Internodien c. 2--4 cm lang. Blätter zahlreich, abstehend, am Grunde etwas gedreht, riemenförmig, gegen die Spitze etwas verschmälert, ziemlich tief 2zähnig, die Zähne fast gleich, sichelig dreieckig, spitz, häufig mit einem Spitzchen und mit einem Spitzchen im Sinus, an der Basis etwas verschmälert, mit oben gefurchter, unten vorragender Mittelrippe, papierartig, beiderseits glänzend grün, c. 14--21 cm lang, 1.7--2.1 cm breit; Scheiden viel länger als die Internodien, angedrückt, röhrig, seitlich zusammengedrückt, vorn aufreissend und mit bald schwarz vertrocknenden Rändern, an der Spitze breiter als die Spreite und beiderseits in einen Zahn ausgehend, schwach glänzend grün. Blütenstand terminal, köpfig, nickend, konvex, sehr dicht und vielblütig, c. 2.2--3.3 cm im Durchmesser, von einigen anfangs zusammengelegten, stumpfen Scheiden umgeben. Partialblütenstände c. 4--5blütig; Pedunculus c. 0.4 cm lang, von einigen einander umfassenden, stumpfen, an der Basis röhrigen, blassen, nach oben grösser werdenden Schaftblättern bedeckt; Brakteen wie die Schaftblätter, c. 0.9 cm lang. Blüten c. 0.7 cm breit, mit blassgelben Sepalen und Petalen. Unpaares Sepalum eirund dreieckig, schmal stumpf mit einem kleinen Spitzchen, konkav, c. 0.4 cm lang, 0.24 cm breit. Paarige Sepalen schief eirund, mit einem pfriemlichen Spitzchen, konkav, aussen gekielt, 0.45 cm lang, 0.26 cm breit. Petalen zurückgebogen, aus schief ungefähr eirunder Basis ziemlich lang und schmal zusammengezogen, schmal stumpf, konvex, c. 0.36--0 375 cm lang, 0.14--0.175 cm breit. Lippe vorgestreckt, der Säule ungefähr parallel, 3lappig, am Grunde sackig, kaum kürzer als die Säule, c. 0.5 cm lang; Hypochil abgerundet, 5nervig, blassgelblich, c. 0.16 cm breit; Seitenlappen aufrecht, der Säule angedrückt, abgerundet dreieckig, vorn von einer viereckigen, abgestutzten, schwach ausgeschnittenen und etwas unregelmässig berandeten, vorn konkaven, am Rande dunkelpurpurnen Querlamelle verbunden; Mittellappen vorgestreckt, etwas zurückgebogen, verkürzt eirund, kaum zugespitzt, fast spitz, an der Basis sehr kurz zusammengezogen, schwach konkav mit 2 grossen, konvexen Verdickungen und einer schwachen Längsrippe, weiss, c 0.25 cm lang, 0.3 cm breit. Säule ziemlich lang, kaum etwas gekrümmt, unten etwas unterhalb der Mitte eingeschnürt, unterhalb der Einschnürung konvex und gegen die Basis nahezu flach, blassgelblich, der obere Teil mit seicht abgerundeten, dunkelpurpurnen Rändern, oben 0.4 cm, unten 0.5 cm lang; Clinandrium konkav, dreieckig, etwas ausgefressen am Rande, mit dreieckiger, stumpfer Spitze und zahnförmigen Öhrchen. Anthere kappig, ungefähr queroval, stumpf, fast 0.1 cm breit. Pollinien 8, keulig, hellgelb, mit der kleinen, braunen Klebmasse fast 0,07 cm lang. Rostellum 2zähnig. Narbe eirund krugförmig, der Unterrand zu einer weit abstehenden, quervierecki-gen, abgestutzten, ziemlich fleischigen, kaum purpurn angelaufenen Quer-

lamelle ausgewachsen. Ovarium stumpf dreikantig, 6furchig, mit schiefer Spitze, weisslich, c. 0,9 cm lang.

* **Agrostophyllum Denbergeri** J. J. S. n. sp.

Caules numerosi, approximati, elongati, recti, compressi, sectione transversa elliptici, apicem versus dilatati, nitidi, dilute virides, c. 20--48 cm. longi, inferne 0.4--0.8 cm., cum vaginis c. 0.75--0.8 cm., apice 1--1.5 cm., cum vaginis c. 1.9--2.3 cm. lati, basi vaginis numerosis densis alternatim bifariis imbricantibus conduplicatis superne accrescentibus et sensim in folia vergentibus obtecti, multifolii, internodiis c. 1.3--2.7 cm. longis, ultimis brevibus. Folia patentia vel plus minusve erecto-patentia, loriformia, apicem versus paululum angustata, apice suboblique rotundata vel obtusa, retusa cum mucrone longiore in sinu, basi semitorta, breviter angustata et conduplicata, costa media supra sulcata subtus prominente, papyraceo-coriacea, nitide viridia, subtus subopaca, c. 8.5--13.5 cm. longa, 1.5--1.85 cm. lata; vaginae internodiis multo longiores, tubulosae, lateraliter compressae, apice basi folii latiores, antice mox rumpentes, margine exarescentes et nigrescentes, apice utrinque in dentem triangulum siccum exeuntes, inferne cauli adpressae, praesertim superiores superne paulum dehiscentes, nitide flavovirides, ad c. 7.75 cm. longae. Inflorescentia terminalis, capituliformis, nutans, semiglobosa, densissime multiflora, c. 2--4 cm. diam., vaginulis exterioribus latis, plus minusve bilobis, mox exarescentibus, ad c. 2 cm. longis. Inflorescentiae partiales breves, c. 3--4florae, pedunculis ad c. 0.5 cm. longis. Bracteae basi tubulosa rachidem amplectentes, adpressae, ovarium includentes, obtusae, nervosae, c. 0.575--1.1 cm. longae. Flores parvi, erecti, adpressi, c. 0.26--0.33 cm. longi, sepalis subparallelis, pallide flavescentibus. Sepalum dorsale ovato-triangulum, obtusum vel leviter acuminatum, dorso ad apicem conico-apiculatum, concavum vel superne convexum, c. 0.275--0.33 cm. longum, 0.14--0.15 cm. latum. Sepala lateralia oblique ovata, subobtusa vel subacuminata, longe subulato-apiculata, concava, costa media dorso incrassata, c. 0.3--0.35 cm. longa, 0.16--0.175 cm. lata. Petala superne recurva, oblique ovato-lanceolata, superne contracta et anguste obtusa vel sensim angustata et acuta, convexa, c. 0.23--0.275 cm. longa, 0.075--0.08 cm. lata. Labellum gynostemio subparallelum, 3lobum, basi saccato-concavum, subtus leviter longitudinaliter sulcatum, c. 0.275 ad fere 0.3 cm. longum, usque ad apicem loborum lateralium c. 0.14 cm. metiens, hypochylio saccato-concavo cum nervis prominentibus, flavescenti; lobi laterales erecti, margine postico basi gynostemii adpressi, oblique semiorbiculares ad semiovales, rotundati, leviter concavi, flavescenti-albi, macula purpurea, lamella transversa quadrangula apice truncata plus minusve excisa vel tricrenata irregulariter marginata atropurpureo-marginata et maculata conjuncti; lobus intermedius porrectus, apice saepe recurvulus, gynostemium superans, transverse ovalis vel saepe plus minusve quinquangularis, apice in lobulum parvum obtusum productus, intus incrassationibus 2 conspicuis convexis donatus, albidus, c. 0.14—0.175 cm. longus, 0.17 ad fere 0.2 cm. latus. Gynostemium breviusculum, curvatum, dorso convexum, basi subtus

convexo-incrassatum, pallide flavescens, purpureo-punctatum, apice et stigmate atropurpureo-marginatum, c. 0.2--0.275 cm. longum, apice triangulo, auriculis satis conspicuis, triangulis. Anthera cucullata, flavescens, c. 0.06 cm. lata. Pollinia 8, oblique obovata, flavescenti-alba. Stigma quadrangulum, margine inferiore elevato. Ovarium sessile, obtuse trigonum, 6sulcatum, virescentialbum, 0.55—0.65 cm. longum.

Java: Buitenzorg, Katoelampa. (L. G. DEN BERGER, bl. im Dezember 1916, 1 Ex.; auch kult. in Hort. J. J. SMITH). Ebenda, Soekaradja in 250 m ü. d. M., im Walde am Wege, 1 Ex. (R. C. BAKHUIZEN VAN DEN BRINK Jr. n. 360, fr. im Juli 1920; leb. Pfl. kult. in Hort. J. J. SMITH). Ebenda, Tjiampea, Pasir Honje bei Leuwiliang, in 350 m ü. d. M., im Walde und Wildnis, epiphytisch, viel. (R. C. BAKHUIZEN VAN DEN BRINK n. 4085, bl. im September 1920).

Priangan, Tasikmalaja. (C. A. BACKER, leb. Pfl. kult. in Hort. Bog. unter n. 1). Ebenda, Noesa Gede im See von Pedjaloe, in 720 m ü. d. M., ziemlich gemein. (S. H. KOORDERS n. 44462β, fr. im Juli 1917; wahrscheinlich hierher gehörend). Djampang Koelon, Tjiemas, in der Nähe der Zandbaai. (R. C. BAKHUIZEN VAN DEN BRINK, leb. Pfl. kult. in Hort. J. J. SMITH).

? Sumatra: Batang Paloepoe. (W. M. DOCTERS VAN LEEUWEN, kult. in Hort. Bog. unter n. 544; es ist nicht ausgeschlossen, dass hier Nummerverwechselung hat stattgefunden).

Die Art wurde von Herrn Dr. L. G. DEN BERGER bei Buitenzorg entdeckt.

Sie ist ungefähr eben so gross wie *A. longifolium* RCHB. F. und *A. latilobum* J. J. S., hat jedoch gegen die Spitze der Stengel allmählich dichter gestellte Blätter. Die Blattscheiden fahren mehr auseinander als bei diesen beiden Arten, aber viel weniger als bei dem viel grösseren *A. laxum* J. J. S. Die Blüten sind kleiner als bei den anderen verwandten javanischen Arten. Die Säule ist verhaltnismässig kurz, und dunkelpurpurn berandet und punktiert.

Die nächste Verwandte ist aber *A. parviflorum* J. J. S. von Neu-Guinea, mit welcher Art sie, wen mehr Material vorliegt, noch näher verglichen werden soll.

Bemerkenswert ist es, dass die Petalen bei der nämlichen Pflanze in der oberen Hälfte zusammengezogen und stumpflich oder gegen die Spitze allmählich verschmälert und spitz sein können.

Agrostophyllum Denbergeri J. J. S.

Stengel zahlreich, dicht beisammen, verlängert, gerade, zusammengedrückt, auf dem Querschnitt elliptisch, gegen die Spitze verbreitert, glänzend hellgrün, c. 20--48 cm lang, nach unten c. 0.4--0.8 cm, mit den Scheiden 0.75--0.8 cm, an der Spitze 1--1.5 cm, mit den Scheiden c. 1.9--2.3 cm breit, am Grunde mit vielen dicht beisammen stehenden, dachigen, zusammengelegten, allmählich grösser werdenden und in die Blätter übergehenden

Scheiden, vielblättrig, die Internodien c. 1.3--2.7 cm breit, die höchsten am kürzesten. Blätter zahlreich, abstehend oder mehr oder weniger aufrecht abstehend, riemenförmig, gegen die Spitze etwas verschmälert, etwas schief abgerundet oder stumpf, eingedrückt mit einem längeren Spitzchen im Sinus, an der Basis etwas gedreht, kurz verschmälert und zusammengelegt, mit oben gefurchter, unten vorragender Mittelrippe, ledrig papierartig, glänzend grün, unten ziemlich matt, c. 8.5--13.5 cm lang, 1.5--1.85 cm breit; Scheiden viel länger als die Internodien, röhrig, seitlich zusammengedrückt, an der Spitze breiter als die Blattbasis, vorn aufreissend, mit bald schwarz vertrocknendem Rande und an der Spitze beiderseits mit einem dreieckigen Zahn, an der Basis dem Stengel angedrückt, besonders die höchsten nach oben etwas auseinander fahrend, glänzend gelbgrün, bis c. 7.75 cm lang. Blütenstand terminal, köpfig, nickend, halbkugelig, sehr dicht vielblütig, c. 2.4 cm im Durchmesser, am Grunde mit breiten, mehr oder weniger 2lappigen, bald vertrocknenden Scheiden. Partialblütenstände c. 3--4blütig; Pedunculus bis c. 0.5 cm lang. Brakteen an der Basis röhrig, den Fruchtknoten umgebend, stumpf, nervig, c. 0.575--1.1 cm lang. Blüten klein, c. 0.26--0.33 cm breit, mit blassgelblichen Sepalen uud Petalen. Unpaares Sepalum eirund dreieckig, stumpf oder schwach zugespitzt, mit einem kegeligen Spitzchen, konkav oder nach oben konvex, c. 0.275--0.33 cm lang, 0.14--0.15 cm breit. Paarige Sepalen schief eirund, stumpflich oder spitzlich, mit einem langen, pfriemlichen Spitzchen, konkav, mit aussen verdickter Mittelrippe, c. 0.3--0.35 cm lang, 0.16--0.175 cm breit. Petalen nach oben zurückgebogen, schief eirund lanzettlich, nach oben zusammengezogen und schmal stumpf oder allmählich verschmälert und spitz, konkav, c. 0.23--0.275 cm lang, 0.075--0.08 cm breit. Lippe der Säule nahezu parallel, 3lappig, c. 0.275--0.3 cm lang; Hypochil sackig konkav, mit innen vorragenden Nerven, gelblich; Seitenlappen aufrecht, mit dem Vorderrande der Säulenbasis angedrückt, schief halbrund bis halboval, abgerundet, gelblichweiss mit einem purpurnen Flecken, vorn von einer viereckigen, abgestutzten, mehr oder weniger ausgeschnittenen oder dreikerbigen, am Rande unregelmässigen, dunkelpurpurn berandeten und gefleckten Querlamelle verbunden; Mittellappen vorgestreckt, an der Spitze meistens etwas zurückgebogen, länger als die Säule, queroval oder mehr oder weniger 5eckig, an der Spitze in ein kleines, stumpfes Läppchen vorgezogen, innen mit 2 grossen, konvexen Verdickungen, weisslich, c. 0.14--0.175 cm lang, 0.17--0.2 cm breit. Säule ziemlich kurz, gebogen, an der Basis unten konvex verdickt, blassgelblich, purpurn punktiert, die Spitze und Narbe dunkelpurpurn berandet, c. 0.2--0.275 cm lang, mit dreieckiger Spitze; Öhrchen ziemlich gross, dreieckig. Anthere kappig, gelblich, 0.06 cm breit. Pollinien 8, schief verkehrt eirund, gelblich weiss. Narbe viereckig, mit erhabenem Unterrande. Ovarium sitzend, stumpf dreikantig, 6furchig, grünlich weiss, 0.55--0.65 cm lang.

***Agrostophyllum laxum** J. J. S. n. sp.—*A. longifolium* J. J. S. (non RCHB. F.) in Fl. Buit. VI, Orch. (1905), 290; Atlas Fig. CCXXII.

Caules approximati, validi, valde compressi, dilute virides, c. 40—80 cm. longi, 1.3—1.5. cm. lati, foliati, basi dense vaginati, internodiis 2—4.25 cm. longis. Folia numerosa, erecto-patentia vel plus minusve recurva, basi semitorta, loriformia, apicem versus angustata, anguste obtusa vel obtusiuscula cum mucrone, basi brevissime subcontracta et conduplicata, costa media supra sulcata subtus prominente, papyraceo-coriacea, utrinque nitidule viridia, inferiora brevia, superiora accrescentia, c. 4—33 cm. longa, 1.4—3.8 cm. lata; vaginae magnae, internodia multo superantes, basi tubulosae et valde lateraliter compressae, ceterum antice mox rumpentes, conduplicatae, late pellucido-deinde aride nigro-marginatae, apice quam basin folii latiores et utrinque in dentem conspicuum triangulum acutum membranaceum productae, superne erecto-patentes, cauli non adpressae, nitidule virides, c. 5—12.5 cm. longae, dimidiatae ad c. 1.7—2 cm. latae. Inflorescentia terminalis, capituliformis, nutans, convexa, densissima, valde multiflora, ad c. 3.5 -4.5 cm. diam., vaginulis conspicuis subcoriaceis suffulta. Inflorescentiae partiales breves, 4—6florae, pedunculo brevi, virescenti-albo, vaginulis amplectentibus membranaceis basi tubulosis superioribus accrescentibus et in bracteas vergentibus incluso, c. 0.275 cm. longo, rachide compressa, pallide virescenti. Bracteae magnae, imbricatae, basi rachidem amplectentes, ovatae, obtusae, tenuiter membranaceo-marginatae, concavae, multinerviae, semipellucide albidae, superne pallide virescentes, ad c. 1.1 cm. longae. Flores quaquaversi, c. 0.9—0.95 cm. lati, sepalis petalisque albis, deinde pallide flavescentibus. Sepalum dorsale ovatum, obtuse acutatum, conico-apiculatum, basi excavato-concavum, ceterum convexum, c. 0.525—0.57 cm. longum, 0.275 cm. latum. Sepala lateralia oblique ovata, subulato-acuminata, leviter concava, lateribus superne leviter convexa, dorso obtuse carinata, c. 0.58—0.6 cm. longa, 0.275 cm. lata. Petala plus minusve reflexa, obliqua, e basi dilatata subovata sublineari-contracta, obtusiuscula, convexa, c. 0.47 cm. longa, supra basin 0.15 cm. lata. Labellum porrectum, cum gynostemio angulum acutum faciens, 3lobum, subtus convexum cum sulco levi longitudinali, in $^{2}/_{5}$ partibus supra basin constrictum, c. 0.475 cm. longum; lobi laterales breves, erecti, gynostemio adpressi, obtusi, concavi, lamella transversa quadrangula subtruncata erosulo-crenulata atroviolaceo-marginata lobis lateralibus paulo breviore basi gynostemii adpressa conjuncti, hypochylium nectarifluum clausum c. 0.15 cm. longum formantes; lobus intermedius porrectus, late triangulus, e basi breviter contracta ambitu transverse rhombeus, triangulo-acuminatus, acutus, angulis lateralibus rotundatus, concavus, longitudinaliter canaliculatus, canalicula superne dilatata, dimidio inferiore in utraque canaliculae parte convexo-incrassatus, explanatus c. 0.3 cm. longus, 0.4 cm. latus. Gynostemium cum ovario angulum obtusum faciens, longum, supra basin obtusangule incurvulum, ceterum subrectum, subsemiteres, dorso convexum, infra apicem paulum constrictum, in c. $^{1}/_{4}$ supra basin subtus constrictum et infra constrictictionem convexo-incrassatum, subtus ad stigmatis basin lamella patentissima transversa horizontali quadrangula truncata antice concava dorso convexa alba atropurpureo-marginata instructum, album, medio atropurpureo-marginatum, c. 0.5 cm. longum, clinandrio concavo, erosulo, apice rotundato et minutissime

purpureo-puncticulato, auriculis dentiformibus. Anthera cucullata, obtusissima, apice obsolete 3lobula, flavescenti-alba, fere 0.3 cm. lata. Pollinia 8, inaequalia, oblique oblongo-obovata, dilute flava, semipellucida, glandula parva, c. 0.08 cm. longa. Rostellum breve, 2dentatum. Stigma longitudinale, lineare. Ovarium sessile, rectum, 6sulcatum, album, c. 0.73—0.8 cm. longum, 0.2 cm. diam.

Java: Batavia, Buitenzorg, Goenoeng Kendeng, an der Tjianten, südlich von Leuwiliang, in 800--1000 m ü. d.M. (C. A. BACKER, bl. im September 1918). Auf dem Salak. (R. C. BAKHUIZEN VAN DEN BRINK, leb. Pfl., kult. in Hort. J. J. SMITH). Krawang, G. Boerangrang. (R. C. BAKHUIZEN VAN DEN BRINK, leb. Pfl., kult. in Hort. J. J. SMITH).

Priangan, auf dem G. Beser bei Tjibeber, in c. 1100 m ü. d M. (W. F. WINCKEL). Ebenda, Tjadas Malang, in 1000 m ü, d. M. (W. F. WINCKEL, kult. unter n. 80; auch kult. in Hort. J. J. SMITH). Tjiandjoer, auf dem G. Gede, Tjibodas, in 1400 m ü. d.M. (Nach dem Namenschildchen in Hort. Tjibodas). Garoet, auf dem G. Mandalagiri. (H. J. LAM, im März 1920, steriel).

Pekalongan, Djolotigo bei Doro in 700--1000 m ü. d. M., an einem Baumstamm in sonniger Lage. (J. J. SMITH, bl. im September 1899).

Die Art ist verwechselt worden mit *A. longifolium* RCHB. F., ist jedoch auch steriel leicht zu unterkennen an die abstehenden Blattscheiden und grösseren Blätter; ausserdem sind die Blüten grösser, die Säule länger und nach oben schmäler, das Stigma schmal und länglich.

Die Beschreibung in ,,die Orchideen von Java" und die Figur wurden nur nach dem bei Doro gesammelten Exemplar aufgestellt.

Beschreibung nach mehreren lebenden Exemplaren.

***Agrostophyllum latilobum** J. J. S. n. sp.

Caules approximati, elongati, levissime flexuosi, bene compressi, pallide virides, c. 90 cm. longi, 0.65 cm., apice ad c. 0.9 cm. lati, cum vaginis c. 0.85--0.95 cm., apice 1--1,2 cm. lati, basi vaginati, vaginis sensim in folia vergentibus, internodiis c. 3--4 cm. longis. Folia numerosa, basi patentia et semitorta, recurva, loriformia, apicem versus sensim angustata, apice angusta, 2dentata, dentibus plus minusve falcato-triangulis cum mucrone plerumque longiore interposito, basi breviter contracta conduplicataque, costa media supra sulcata subtus tenuiter prominente, margine recurvula, papyracea, utrinque nitide viridia, ad c. 14.5--18.5 cm. longa, 1.7--1.9 cm. lata; vaginae adpressae, internodium multo superantes, tubulossae, compressae, antice mox rumpentes et nigro-marginatae, apice quam basin laminae latiores, truncatae et utrinque subdentiferae, c. 0.85--0.95 cm., superiores ad c. 1.2 cm. latae. Inflorescentia terminalis, capituliformis, nutans, semiglobosa, dense multiflora, 2--3.5 cm. diam., vaginis suffulta. Inflorescentiae partiales c. 3--4florae, pedunculo c. 0.45 cm. longo, nonnullis vaginulis superne accrescentibus et in bracteas vergentibus amplectentibus tubulosis carinatis donato. Bracteae basi tubulosae, apice fissura saepe bilobae, concavae, ad c. 1.15 cm. longae. Flores mediocres, 1 cm vel plus lati, sepalis

pallide flavescentibus. Sepalum dorsale subovato-ovale, conspicue acute conico-apiculatum, concavum, superne saepe recurvum convexumque, 3nervium, c. 0.6 cm. longum, 0.3 cm. latum. Sepala lateralia oblique ovata, longe subulato-apiculata, concava, dorso carinata, 3nervia, c. 0.64 cm. longa, 0,3 cm. lata. Petala divergentia, recurva, oblique oblonga, ⅓ superiore circiter leviter contracta, obtusa, convexa, 3nervia, alba, c. 0,55 cm. longa, 0.16 cm. lata. Labellum cum gynostemio angulum acutum faciens, 3lobum, c. 0 575 cm. longum, hypochylio concavo, vix saccato, a lobo medio subtus constrictione inconspicua sejuncto, subrotundo, nervis 5 intus prominentibus, pallide flavescenti, c. 0.23 cm. longo; lobi laterales erecti, basi gynostemii utrinque adpressi, semiovali-trianguli, rotundati, lamella transversa medio in lobulum late triangulum obtusum vel subsemiorbicularem producta apice recurvula gynostemio adpressa lobis paulo altiore antice conjuncti; lobus intermedius porrectus, e basi satis angusta transverse rhombeus, obtusus, brevissime obtuse apiculatus, marginibus anticis minute erosulus, ima basi transverse excavatus, incrassationibus 2 convexis antice evanescentibus canalicula basi vix conspicua separatis supra basin, albus, c. 0.35 cm. longus, 0.575 cm. latus. Gynostemium cum ovario angulum obtusum faciens, satis longum, subrectum vel plerumque leviter obtusangule curvatum, dorso convexum, paululum infra medium subtus satis conspicue constrictum, parte superiore subtus concavum, parte inferiore convexum basin versus leviter concavum, vix flavescenti-album, medio in utraque stigmatis marginis inferioris parte purpureo-marginatum, c. 0.5 cm. longum, clinandrio alte excavato, apice obtuso, auriculas breves triangulas apiculatas vel plus minusve denticulatas paulum superante. Anthera cucullata, vix a dorso compressa, semirotunda, apice in appendicem late triangulam obtusam producta, albida, bene 0.1 cm. lata. Pollinia 8, oblique clavata, flava, glandula parva orbiculari castanea, bene 0.1 cm. longa. Rostellum 2partitum, dentibus falcatulo-triangulis, acutissimis. Stigma longitudinale, oblongum, margine inferiore in lamellam transversam patentissimam semirotundam vel plus minusve quadrangulam postice convexam antice leviter concavam carnosulam auctum. Ovarium pedicellatum trigonum, 6sulcatum, c. 0.9 cm. longum.

Java: Buitenzorg, auf dem Salak zwischen Goenoeng Boender und dem Krater, in c. 1500 m ü. d. M. (J. J. SMITH, bl. im August 1909). Auf dem Salak. (W. M. DOCTERS VAN LEEUWEN, bl. im März 1919, kult. in Hort. J. J. SMITH).

Banjoemas, auf dem Slamat am Südhang, in c. 1700 m ü. d. M. (C. A. BACKER n. 408, bl. im April 1911).

Nahe verwandt mit *A. longifolium* RCHB. F. Die Art underscheidet sich jedoch durch das weniger eiförmige unpaare Sepalum, gegen die Basis weniger verbreiterte Petalen, ein verhältnismässig bedeutend kleineres Hypochil, ein in der Mitte in ein Läppchen vorgezogenes Querplättchen zwischen den Seitenlappen, einen mehr querrautenförmigen Mittellappen mit kleineren Verdickungen.

Beschreibung nach einem lebenden Exemplar und Alkoholmaterial.

Agrostophyllum latilobum J. J. S.

Stengel verlängert, zusammengedrückt, schwach zickzackig, blassgrün, c. 90 cm lang, 0.65 cm, an der Spitze 0. 9 cm, mit den Scheiden c. 0.85—0.95 cm, an der Spitze 1--1.2 cm breit; Internodien 3--4 cm lang. Blätter zahlreich, abstehend, umgebogen, am Grunde etwas gedreht, riemenförmig, allmählich verschmälert gegen die Spitze, an der Spitze mit 2 sichelig dreieckigen Zähnen und einem meitstens längeren Spitzchen, mit oben gefurchter, unten vorragender Mittelrippe, papierartig, beiderseits glänzend grün, bis c. 14.5--18.5 cm lang, 1.7--1.9 cm breit; Scheiden anliegend, viel länger als die Internodien, röhrig, zusammengedrückt, bald vorn aufreissend und schwarz trockenhäutig berandet, an der Spitze breiter als die Basis der Spreite, abgestutzt und beiderseits eckig, c. 0.85--0.95 cm, die höheren bis 1.2 cm breit. Blütenstand terminal, köpfig, nickend, halbkugelig, dicht vielblütig, 2--3 5 cm im Durchmesser, von grossen Scheiden umgeben. Partialblütenstände c. 3--4blütig; Pedunculus 0.45 cm lang, mit wenigen nach oben grösser werdenden und in die Brakteen übergehenden, röhrigen, gekielten Schaftblättern. Brakteen an der Basis röhrig, konkav, bis 1.15 cm lang. Blüten mittelgross, 1 cm oder mehr breit, mit blassgelblichen Sepalen. Unpaares Sepalum schwach eiförmig oval, mit einem bedeutenden, spitzen, kegeligen Spitzchen, 3nervig, 0.6 cm lang, 0.3 cm breit. Paarige Sepalen schief eiförmig, mit einem langen, pfriemlichen Spitzchen, konkav, aussen gekielt, 3nervig, 0.6 cm lang, 0.3 cm breit. Petalen schief länglich, das obere $^1/_3$ zusammengezogen, stumpf, 3nervig, 0 55 cm lang, 0 16 cm breit. Lippe mit der Säule einen spitzen Winkel bildend, 3lappig, 0.575 cm lang; Hypochil konkav, kaum sackig, unten durch eine schwache Einschnürung vom Mittellappen getrennt, rundlich, mit 5 innen vorragenden Nerven, blassgelblich, c. 0 23 cm lang; Seitenlappen aufrecht, der Basis der Säule angedrückt, halboval dreieckig, abgerundet, von einer in der Mitte in ein stumpfes, dreieckiges Läppchen vorgezogenen, an der Spitze zurückgebogenen, der Säule angedrückten Querlamelle verbunden; Mittellappen vorgestreckt, quer rautenförmig, stumpf, vorn etwas ausgefressen, innen mit 2 konvexen, von einer an der Basis undeutlichen Längsrinne getrennten, nach vorne verschwindenden Verdickungen, weiss, 0.35 cm lang, 0.575 cm breit. Säule ziemlich lang, meistens schwach gebogen, unten etwas unterhalb der Mitte eingeschnürt, der obere Teil unten konkav, der untere Teil konvex, gegen die Basis schwach konkav, etwas gelblichweiss, in der Mitte beiderseits des Unterrandes der Narbe purpurn berandet, 0.5 cm lang; Clinandrium ausgehöhlt; Öhrchen kurz, dreieckig, mit einem Spitzchen oder etwas gezähnelt. Anthere kappig, halbrundlich, an der Spitze breit dreieckig vorgezogen, stumpf, weisslich, gut 0 1 cm breit. Pollinien 8, schief keulig, gelb, mit kleiner brauner Klebmasse, gut 0.1 cm breit. Narbe länglich, am Unterrande mit einem weit abstehenden, viereckigen, abgestutzten, unten konvexen, dünnfleischigen Querplättchen. Ovarium mit dem Stielchen dreikantig, 6furchig, 0.9 cm lang.

***Cetatostylis braccata** RCHB. F. in Bonplandia V (1857), 53; J. J. S. in Fl. Buit. VI, Orch. (1905), 303.

Rhizoma breve, ramosum, omnino vaginis siccis membranaceis fuscis tectum, radicibus tenuibus. Caules erecti, subteretes, 2nodes, nitide virides, c. 5—11 cm. longi, 0.2—0.225 cm. diam., 1folii; basi vaginis tubulosis amplectentibus pallidis fusce reticulato-venosis superioribus accrescentibus ad c. 4.5 cm. longis donati, in c. 0.85—2.5 cm. infra apicem vaginam similem c. 2.5—3.5 cm. longam gerentes. Folium erectum, lineari-lanceolatum, breviter inaequaliter obtuse 2lobulum, basi acuta abrupte in petiolum contractum, supra canaliculatum cum lateribus convexis, subtus obtusangule convexum, carnosum, nitide viride, c. 6.75—10 cm. longum, 1.2—0.95 cm. latum; petiolus teres, supra canaliculatus, c. 0.4 0.7 cm. longus, cum vagina canaliculata basi tubulosa dilute viridi c. 0 4—0.5 cm. longa articulatus. Inflorescentia fascicularis, squamis reticulatis, pedunculis tenuibus, pilosis, purpurascentibus, c. 1 cm. longis, 1floris. Bractea brevissima. Flores 1 vel pauci simultanee aperti, c. 0.5 cm. lati, 0.8 cm. longi, sepalis dorso adpresse longiuscule pilosis, sordide purpureis, apice pallide flavescentibus. Sepalum dorsale basi porrectum et leviter concavum, deinde recurvum, subovatum, superne angustatum, obtusum, 3nervium, c. 0.37 cm. longum, 0.18 cm. latum. Sepala lateralia lacinia conspicua obliqua basi dilatata et inflata ad pedem gynostemii decurrentia, mentum rectum cum ovario angulum acutum faciens teres apice inflato-dilatatum et leviter retusum clavatum c. 0.27 cm. longum apice 0.2 cm. latum formantia, parte antica recurva, oblique oblonga, acuta, basi concava, c. 0.4 cm. longa, fere 0.2 cm. lata, tota c. 0.7 cm. longa. Petala basi porrecta et sepalo intermedio adpressa, $^2/_5$ partibus superioribus recurva, oblique rhombeo-lanceolata, longe acuminata, subacuta, 1nervia, albida, striis 2 latis longitudinalibus dilute sordide purpureis in dimidio inferiore, fere 0.4 cm. longa, 0.1 cm. lata. Labellum supra basin obtusangule recurvum, subsigmoideum, spathulatum, concavum, costis 2 longitudinalibus puberulis in dimidio inferiore, subtus inconspicue sulcatum, explanatum c. 0.6 cm. longum, ungue cuneato-oblongo, marginibus incurvis crispato, ciliolato, pallide purpureo, obscurius marginato, c. 0.25 cm. longo, in laminam triangulo-ovatam obtusam basi utrinque in lobulum vix distinctum rotundatum erectum concavum tenuem colore unguis dilatatam $^2/_3$ partibus superioribus incrassatam supra subtusque convexam flavam c. 0.35 cm. longam 0.24 cm. latam dilatato. Gynostemium bipartitum, album, c. 0.175 cm. longum, brachiis oblongis, obtusis, extus convexis, intus concavis. Anthera parva, cucullata, alba, c. 0.06 cm. lata, connectivo incrassato, plano, apice leviter producto et rotundato-truncato. Pes gynostemii cum ovario angulum acutum faciens, linearis, fere 0.2 cm. longus. Ovarium curvatum, teres, 6sulcatum, adpresse pilosum, atropurpureum, basi pallidum, c. 0.525 cm. longum.

Java: Priangan, bei Bandoeng. (H. ZOLLINGER).

Soerabaja, auf dem Andjasmoro am Westhang, 1000 m ü. d. M. (S. DE MEYIER, kult. unter n. 50).

Pasoeroean, auf dem Ardjoeno in 1600 m ü.d M. (H. ZOLLINGER n. 2254!).

Besoeki, auf dem Ijang Gebirge, 2100 m ü. d. M. (C. A. BACKER n. 9770, fr. im Oktober 1913). Ebenda in 2000 m ü. d. M. (C. A. BACKER n. 9875, im Oktober 1918).

Bali: Goenoeng Batoe Kaoe, in 1650 m ü. d. M. (Exp. R. MAIER, SARIP n. 432, bl. im Oktober 1918).

Die Beschreibung wurde angefertigt nach einer mir von Herrn S. DE MEYIER freundlichst zugeschickten Pflanze, die in meinem Garten zur Blüte gelangte.

Ich habe keine Exemplare von Bandoeng, woher REICHENBACHS Original stammt, gesehen.

Ein ausgezeichnetes Merkmal für die Art wird von der grossen, netzadrigen Scheide im oberne Teile der Stengelchen dargestellt; dieselbe ist nicht abnormal, wie ich früher annehmen zu dürfen glaubte.

Eria Schildiana SCHLTR. in ENGL. Bot. Jahrb. XLV, Beibl. n. 104 (1911), 40. — *E. multiflora* LNDL. var. *Van Hasseltii* J. J. S. in Fl. Buit. VI, Orch. (1905), 400; Atlas, fig. CCCII. — *E. myriantha* KRZL. in Pflanzenr. IV. 50. II. B. 21. (1911), 107, fig. 22.

Die früher als *E. multiflora* LNDL. var. *Van Hasseltii* J. J. S. beschriebene Pflanze stimmt vorzüglich mit der in den Gebirgen West-Sumatras offenbar sehr gemeinen *E. Schildiana* SCHLTR. überein.

Eria Jagoriana KRZL. in ENGL. Bot. Jahrb. XLIV, Beibl. n. 101 (1911), 24; in Pflanzenr. IV. 50. II. B. 21 (1911), 93, fig. 19 A—C. — *E. tenggerensis* J. J. S. in Bull. Jard. Bot. Buit. 2e sér. n. XIV (1914), 37.

Java: Priangan, Tjibeber, Tjidadap, 1000 m. (W. F. WINCKEL). Garoet, Malabar. (J. BOSSCHA, 1916). Ebenda, Papandajan, 1500—1700 m. (L. B. VAN DER HEGGE ZIJNEN). Tjitjalengka, Tjiparioek. (H. A. GUSDORF, kult. in Hort. Bog.).

Cheribon, Goenoeng Tjerimai, 900 m. (C. A. BACKER n. 4866 und 4866 bis, bl. im Oktober 1912; auch kult. in Hort. Bog.).

Pekalongan, Goenoeng Slamat. (Kult. in Hort. Bog.).

Pasoeroean, Goenoeng Tengger, bei Nongkodjadjar. (M. BUYSMAN n. 47; auch kult. in Hort. J. J. SMITH). Ebenda Andanasari. (J. KUYPER, bl. im November 1915).

Wiewohl die Beschreibung und Figur besonders der Lippe nicht sehr zutreffend sind, glaube ich doch, dass in *E. tenggerensis* die KRÄNZLINsche Art vorliegt.

* **Dendrobium aureilobum** J. J. S. n. sp.

Rhizoma validum, elongatum, repens, ramosum, teres, nitidum, olivaceum, deinde plus minusve flavo-viride, c. 0.6—0.7 cm. diam., internodiis c. 2.2—2.6 cm. longis. Caules c. 9—17.5 cm. distantes, adscendentes, deinde nutantes, ramosi, subteretes, nitidi, virides, deinde sordide viridi-flavi, plus

minusve rubro-suffusi. ad c. 1.2 cm. longi; caulis primarius subteres, c. 7nodis, c. 23—25 cm. longus, 0.45 cm. diam., basin versus paulo attenuatus, internodio ultimo in pseudobulbum paulum compressum oblique lanceolatum basi apiceque angustum sectione transversa latius ellipticum deinde sulcatum c. 5—6 cm. longum 1—1.9 cm. latum 1folium incrassato. Folium lanceolatum, apice angustatum, brevissime bilobulum cum mucrone interposito, basi brevissime contractum et conduplicatum, margine recurvulum, costa media supra sulcata subtus carinata, coriaceum, nitide viride, subtus opacum et pallidius, c. 15.5—17 cm. longum, 3.7—3.9 cm. latum. Inflorescentiae ante et pone folium, fasciculares, brevissimae, squamis siccis cinctae, pedunculis 1floris, albidis, c. 0.9 cm. longis, vaginulis imbricantibus tubulosis saltem superioribus acuminatis carinatis mox exarescentibus furfuraceo-punctatis ad c. 0.7 cm. longis tectis. Bractea parva, adpressa, triangula, acuta, flavescenti-alba. Flos mediocris, ephemerus, odoratus, sepalis petalisque patentibus, superne recurvis, albis, $^1/_3$—$^1/_2$ parte inferiore praesertim ima basi dense fusco-purpureo-punctatis. Sepalum dorsale oblongum, conico-acutum, basi vix contractum, convexum, apice leviter concavum, c. 1.7—1.9 cm. longum, 0.57—0 66 cm. latum. Sepala lateralia cum pede gynostemii mentum breve cum ovario angulum subrectum faciens crasse conicum truncatum c. 0.46 cm. longum formantia, olique oblonga, acuta, basi margine antico paulo dilatata, convexa, basi apiceque concava, c. 1.8—2 cm. longa, basi 0.8—0.85 cm., medio 0.5—0.625 cm. lata. Petala anguste et oblique lanceolata, acuta, intus extusque longitudinaliter sulcata, c. 1.9—2.1 cm. longa, 0.35—0.45 cm. lata. Labellum basi parallelum pedi gynostemii erectum, subelastice insertum, valde recurvum, 3lobum, 3costatum, costis exterioribus in hypochylio rectis dorso dilatatis et canaliculatis confluenter dilute purpuree punctatis, in ungue et basi laminae lobi intermedii crispatis et dilute viridi-marginatis, in parte antica lobi intermedii ad costulas inconspicuas reductis, costa tertia humili, recta, e basi usque ad apicem, subtus longitudinaliter sulcatum, totum explanatum bene 2—2.25 cm. longum, hypochylio cuneato, pallide flavescenti, purpureo-punctato, basi dilute viridi, apice loborum lateralium flavescenti ad citrino, quam lobum intermedium multo angustiore, usque ad apicem loborum lateralium 0.95 cm. longo, 1 cm. lato; lobi laterales erecti, incurvi, concavi, gynostemium bene superantes, parte libera breves, late trianguli, obtusi, margine antico subrotundati et suberosuli; lobus intermedius magnus, recurvus, unguiculatus, totus c. 1.3 cm. longus, ungue quadrangulo, superne grosse crenato, citrino, c. 0.4—0.5 cm. longo, lamina latissima, cuneato-flabellata, valde plicata et lacerata, apice truncata cum dente apicali triangulo acuto, aureus, bene 2—2.4 cm. latus. Gynostemium oblongum, dorso convexum, flavescenti-album, c. 0.34--0.4 cm. longum, clinandrio alte excavato, apice triangulo obtuso, auriculis longioribus, denticulatis. Anthera cucullata, antice quinquangularis, apice obtusa et minute papillosa, dorso truncata, alba, c. 0.17 cm. lata. Pollinia 4, lateraliter compressa, oblique oblonga, supra convexa, subtus recta, dilute flava, c. 0.125 cm. longa. Stigma parvum, alte excavatum, ovatum. Pes gynostemii cum ovario angulum rectum vel

plus minusve obtusum faciens, rectus, oblongus, obtusus, dorso convexus et purpureo-punctatus, intus canaliculatus, flavescenti-albus, apice excavatione conspicua longitudinali oblonga sulcis 3costata viridi instructus, c. 0.475 cm. longus. Ovarium anguste obconicum, teres, apice valde obliquum, pallide flavescens, minute furfuraceo-punctatum, cum pedicello c. 0.75—0.8 cm. longum.

Java: Priangan, auf dem Goenoeng Gede. (Kult. in Hort. Bog). Tjadas Malang, Tjidadap bei Tjibeber. (Kult. in Hort. W. F. WICNKEL, Tjidadap, unter n. 182 (pp). und in Hort. J. J. SMITH).

Pasoeroean, Tengger bei Nongkodjadjar. (M. BUYSMAN);Loemadjang. (E. CONNELL). Auf dem Adjoeno. (Kult. in Hort. P.H M. TRAVAGLINO, Lawang).

Sumatra: Gajö-landen. (Lieutenant-General G. C. E. VAN DAALEN, leb. Pfl., kult. in Hort. Bog.)

Unter den mit *D. Macraei* LNDL. durch das kurze Kinn am meisten verwandten Arten ist die vorliegende leicht zu unterkennen an die sehr verschiedene Blütenfärbung, besonders an den grossen, an *D. flabellum* RCHB. F. erinnernden, aber schön gelben Mittellappen. Die terminalen Internodien sind kürzer, weniger zusammengedrückt und an der Spitze dünner als bei *D. luxurians* J. J. S.

Wie aus den obenstehenden Angaben hervorgeht, ist die Pflanze in West- und Ost-Java gesammelt worden und kommt, falls das Namenschildchen im Botanischen Garten richtig ist, auch in Nord-Sumatra vor.

Beschreibung nach lebenden Exemplaren.

Dendrobium aureilobum J. J. S.

Rhizom kräftig, kriechend, verlängert, verzweigt, stielrund, c. 0.6 — 0.7 cm dick, die Internodien bis c. 2,2 — 2.6 cm lang. Stengel c. 9 — 17.5 cm auseinander, verzweigt, glänzend, grün, nachher schmutzig grüngelb, mehr oder weniger rot angelaufen, bis 1.2 m lang; Hauptstengel nahezu stielrund, c. 7gliedrig, 23 – 25 cm lang, 0.45 cm dick, das Endglied zu einem wenig zusammengedrückten, schief lanzettlichen, an der Basis und Spitze schmalen, 5 — 6 cm langen, 1 — 1.9 cm breiten, 1blättrigen Trugknollen verdickt. Blatt lanzettlich, an der Spitze verschmälert und sehr kurz 2lappig mit einem Spitzchen, an der Basis sehr kurz zusammengezogen und zusammengelegt, mit oben gefurchter, unten gekielter Mittelrippe, ledrig, glänzend grün, unten matt und blasser, 15.5—17 cm lang, 3.7—3.9 cm breit. Blütenstände büschelig, vor und hinter dem Blatte, von trocknen Schuppen umgeben; Pedunculus c. 0.9 cm lang, 1blütig. Blüte mittelgross, 1tägig, die Sepalen und Petalen nach oben zurückgebogen, weiss, im unteren Teile braunpurpurn punktiert. Sepalen länglich, spitz, 1.7—2 cm lang, 0.57—0.65 cm breit, die paarigen schief, am Grunde etwas verbreitert und 0.8—0.85 cm breit, ein kurzes, kegeliges, abgestutztes, 0.46 cm langes Kinn bildend. Petalen schmal lanzettlich, 1.9—2.1 cm lang, 0.35--0.45 cm breit. Lippe stark zurückgekrümmt, 3lappig, 3rippig, im ganzen 2—2.25 cm lang, die äusseren Leisten auf dem Hypochil gerade, auf dem Rücken verbreitert und rinnig, auf dem Nagel und der Basis des Mittellappens stark wellig und hellgrün berandet, auf dem vorderen Teil des Mittellappens zu schwachen Rippchen reduziert, die mittlere Rippe schwach und gerade; Hypochil keilig, blassgelblich, purpurn punktiert, an der Basis hellgrün, die Spitze der Seitenlappen gelb, 0.95 cm lang, 1 cm breit; Seitenlappen eingebogen, mit kurzer, freier, breit dreieckiger, stumpfer, Spitze; Mittellappen gross, genagelt, 1.3 cm lang, der Nagel viereckig, nach oben hin grob gekerbt, gelb, 0.4 — 0.8 cm lang, die Platte breit, keilig facherförmig, stark gefaltet und zerfetzt, an der Spitze sehr breit, abgestutzt und mit einem Zahn in der Mitte, goldgelb, 2 — 2.4 cm breit. Säule gelblichweiss, 0.34 — 0.4 cm lang, die Öhrchen dreieckig, gezähnelt. Anthere kappig, 5eckig, an der Spitze stumpf und papillös, weiss, 0.17 cm breit. Pollinien 4, länglich, hellgelb. Narbe eirund. Säulenfuss mit dem Fruchtknoten einen rechten oder mehr oder weniger stumpfen Winkel darstellend, gerade, länglich, stumpf, rinnig, gelblichweiss, an der Spitze mit einer 3rippigen, grünen Aushöhlung, 0.475 cm lang. Ovarium 6furchig, an der Spitze sehr schief, blassgelblich, mit dem Stielchen 0.75 — 0.8 cm lang.

***Dendrobium luxurians** J. J. S. n. sp.

Rhizoma validum, elongatum, repens, valde ramosum, teres, nitidum, dilute olivaceum, deinde flavo-viride, c. 0.6—0.75 cm. diam., initio vaginis tubulosis obtusis pallide virescentibus mox exarescentibus et avellaneis minute furfuraceo-punctatis omnino obtectum, internodiis ad c. 1.9—2.2 cm. longis, radicibus tenuibus. Caules c. 10—20 cm. dissiti, adscendentes, deinde patentes, ramosi, valde nitidi, dilute virides, deinde flavovirides, toti ad c. 40—55 cm. longi; caulis primarius totus c. 19—27 cm. longus, 6—8nodis, subteres, c. 0.4—0.6 cm. diam., internodiis basi paulo attenuatis, c. 2.5—3.25 cm. longis, internodio ultimo in pseudobulbum oblique lanceolatum compressum sectione transversa ellipticum apice magis compressum infra medium latissimum apice truncatum basi paulo angustatum deinde sulcatum c. 7—8 cm. longum 1.25—1.75 cm. latum 1folium incrassato, ramis cauli primario similibus, plus minusve decrescentibus, cum internodiis ultimis marginibus saepe subparallelis. Folium recurvum, oblongum ad lanceolatum, apice angustatum, obtusum, saepe plus minusve bidentatum, basi breviter abrupte contractum et conduplicatum, costa media supra sulcata subtus carinata, margine recurvulum, coriaceum, supra nitide viride, subtus opacum, dilute viride, ad c. 15—20 cm. longum, 5.4—5.8 cm. latum. Inflorescentiae pone rarius etiam ante folium, fasciculatae, breves, squamis siccis cinctae, pedunculis teretibus, albis, c. 0.33 cm. longis, 1floris. Bractea brevissime triangula, adpressa, alba. Flos mediocris, leviter odoratus, ephemerus, sepalis petalisque convexis, albis, $^3/_5$ — $^2/_3$ partibus inferioribus atropurpureo-maculatis, maculis supra basin plus minusve interruptis. Sepalum dorsale oblongum ad lanceolatum, acutum, c. 1.4—1.8 cm. longum, 0.5 cm. latum. Sepala lateralia cum pede gynostemii mentum breve conicum cum ovaria angulum subrectum vel obtusum faciens obtusum c. 0.425—0.6 cm. longum formantia, oblique oblonga ad lanceolata, apice recurva, acuta, basi obliqua et margine antico oblique dilatata, costa media dorso

prominula, c. 1.4—1.7 cm., margine antico 1.75—1.9 cm. longa, basi 0.8 cm., medio 0.45—0.47 cm lata. Petala oblique anguste lanceolata, acuta, intus longitudinaliter sulcata, c. 1.43—1.8 cm. longa, 0.37—0.35 cm. lata. Labellum erectum, valde recurvum, 3lobum, 3costatum, costis exterioribus inferne rectis parallelis dorso dilatatis et canaliculatis, in ungue lobi intermedii valde plicatis saepe pallide viridi-marginatis, ad basin laminae evanescentibus, costa intermedia multo minore, recta, fere ad apicem producta, papillosum, subtus sulcatum, album, dense in lobo intermedio grossius atropurpureo-punctatum basi flavo-viride, explanatum ambitu cuneatum, basi leviter contractum, c. 1.7—1.8 cm., usque ad apicem loborum lateralium 1—1.1 cm. longum, ad lobos laterales c. 0.8—0.825 cm. latum; lobi laterales erecti, porrecti, supra gynostemium incurvi, gynostemium bene superantes, parte libera conspicua, oblique ovali, obtusa, concava, margine antico undulata et irregulariter marginata, c. 0.3 cm. longa; lobus intermedius magnus, conspicue unguiculatus, totus c. 0.85—0.9 cm. longus, ungue oblongo, quadrangulo, margine repandulo, 0.36—0.45 cm. longo, 0.3 cm. lato, lamina valde abrupte dilatata, transverse subquadrangula, utrinque irregulariter lobata et valde plicata, lateribus angulum obtusum faciente, apice latissima, subtruncata, leviter late retusa cum dente triangulo, usque ad apicem unguis c. 0.5—0.45 cm. longa, 1.2—1.4 cm. lata. Gynostemium subconicum, albidum, parce apice et subtus dense atropurpuree punctatum, c. 0.3--0.4 cm. longum, clinandrio alte excavato, dorso triangulo, auriculis triangulis, denticulatis. Anthera cucullata, ambitu quadrangula, apice contracta leviter rotundata et hirtella, dorso retusa, albida, apice excepto atropurpureo-punctata, c. 0.16 cm. lata. Pollinia 4, oblonga, lateraliter compressa, subcurvula, extus convexa, nitida, flava, c. 0.12 cm. longa. Stigma excavatum, ovato-triangulum. Pes gynostemii cum ovario angulum subrectum vel obtusum faciens, rectus, concavus, albidus, basi excavatione conspicua triangula dilute viridi deinde ochrascente donatus, omnino minute atropurpuree punctatus, c. 0.4—0.6 cm. longus. Ovarium anguste obconicum, 6sulcatum, nitide flavescenti-albidum, minute furfuraceo-puncticulatum, cum pedicello brevi c. 0.75—0.95 cm. longum.

Java: Ohne Standortsangabe. (Kult. in Hort. Bog.).

Borneo: Goenoeng Labang, im nördlichen Teile, (Exp. zur Grenzberichtigung in Nord-Borneo 1912. (AMDJAH, leb. Pfl., kult. ir Hort. Bog. IIM, e32). West-Koetei, Mahakam. (W. C. VAN GELDER, kult. unter n. 30).

Die nächste Verwandte dieser sehr üppig wachsenden Art ist wohl *D. maculosum* J. J. S., von dem sie u. m. verschieden ist durch die länglichen bis lanzettlichen Blätter, die meistens hinter seltener auch vor dem Blatte stehenden Inflorescenzen mit viel künrzeren Schaftblättern, schmälere Sepalen und Petalen, einen länger genagelten Mittellappen und kürzeren Säulenfuss. Die Färbung der Blüten der beiden Arten ist nahezu die gleiche, die Zeichnung jedoch verschieden.

Die Blüten des Exemplars von Borneo sind etwas grösser und die Grundfarbe ist etwas mehr gelblich.

Beschreibung nach lebenden Exemplare.

Dendrobium luxurians J. J. S.

Rhizom kräftig, kriechend, verlängert, stark verzweigt, stielrund, c. 0.6—0.75 cm dick, die Internodien bis c. 1.9—2.2 cm lang. Stengel c. 10 - 20 cm auseinander gestellt, verzweigt, hellgrün, nachher gelbgrün, bis 40—55 cm lang; Hauptstengel 19—27 cm. lang, 6—8gliedrig, fast stielrund, 0.4—0.6 cm dick, das Endglied zu einem schief lanzettlichen, besonders gegen die Spitze zusammengedrückten, abgestutzten, c. 7—8 cm langen, 1.25—1.75 cm breiten, 1blättrigen Trugknollen verdickt; Äste dem Hauptstengel ähnlich. Blatt länglich bis lanzettlich, stumpf oder stumpflich, häufig mehr oder weniger 2zähnig, am Grunde kurz zusammengezogen und zusammengelegt, mit oben gefurchter, unten gekielter Mittelrippe, ledrig, oben glänzend grün, unten matt und heller, bis 15—20 cm lang, 5.4—5.8 cm breit. Blütenstände büschelig, hinter seltener auch vor dem Blatte, von trocknen Schuppen umgeben; Pedunculus 0.33 cm lang, 1blütig. Blüte mittelgross, schwach riechend, 1tägig; die Sepalen und Petalen konvex, weiss, im unteren Teile dunkelpurpurn gefleckt. Sepalen lanzettlich, spitz, c. 1.4—1.7 cm lang, 0.5—0.45 cm breit, die paarigen am Grunde schief verbreitert, 0.8—0.9 cm breit, ein kurzes, kegeliges, stumpfes, 0.425—0.65 cm langes Kinn bildend. Petalen schmal lanzettlich, spitz, c. 1.43—1.7 cm lang, 0.37—0.3 cm breit. Lippe gekrümmt, 3lappig, weiss, dunkelpurpurn punktiert, an der Basis gelbgrün, ausgespreizt c. 1,7 cm, bis zur Spitze der Seitenlappen 1 cm lang, über die Seitenlappen 0.8—0.825 cm breit, die äusseren Rippen im unteren Teile gerade und auf dem Rücken rinnig, auf dem Nagel des Mittellappens stark wellig, auf der Platte verschwindend, die mittlere Rippe viel schwächer und gerade; Seitenlappen aufrecht, vorgestreckt, über die Säule gebogen, der freie Teil schief oval, stumpf, mit unregelmässig berandetem Vorderrande, 0.3 cm lang; Mittellappen gross, genagelt, 0,85—0.9 cm lang, der Nagel länglich, klein randschweifig, 0.36—0.45 cm lang, 0.3 cm breit, die Platte stark verbreitert, ungefähr quer viereckig, unregelmässig gelappt, stark gefaltet, an der breiten Spitze nahezu abgestutzt und in der Mitte mit einem dreieckigen Zahn, 0.5—0.45 cm lang, 1,2—1.4 cm breit. Säule weisslich, dunkelpurpurn punktiert, 0.3—0.45 cm lang, die Öhrchen dreieckig, gezähnelt. Anthere kappig, viereckig, an der Spitze zusammengezogen, schwach abgerundet und kurz behaart, am Rücken eingedrückt, dunkelpurpurn punktiert, 0.15 cm breit. Pollinien 4, länglich, gelb. Narbe eirund dreieckig. Säulenfuss mit dem Ovarium einen rechten oder stumpfen Winkel bildend, gerade, an der Spitze mit einer hellgrünen, nachher gelblichen Aushöhlung, dunkelpurpurn punktiert, c. 0.4—0.6 cm lang. Ovarium 6furchig, mit dem Stielchen gelblichweiss, 0.75—0.9 cm lang.

***Dendrobium puncticulosum** J. J. S. n. sp.

Rhizoma repens, elongatum, validum, ramosum, teres, nitide flavoviride, ad c. 0.625 cm. diam., internodiis ad c. 2 cm. longis, radicibus tenuibus. Caules c. 8—16 cm. dissiti, adscendentes, bene ramosi, rigidi, nitidi, sordide virescenti-flavi, fusco-rubescenti-suffusi, toti ad c. 75 cm. longi; caulis primarius

teres, totus c. 29—37 cm. longus, 0.35—0.45 cm diam., internodiis c. 3—3 5 cm. longis, internodio ultimo in pseudobulbum multo majorem oblique lineari-lanceolatum basi plus minusve stipitato-contractum apice truncatum compressum sectione transversa ellipticum c. 5.5—7 cm. longum 1—1.1 cm. latum 1folium incrassato, ramis cauli primario similibus sed decrescentibus Folium lanceolatum, apice angustatum, anguste obtusum, basi breviter abrupte contractum, costa media supra sulcata subtus anguste carinata, margine recurvum, tenuiter coriaceum, supra nitidule viride, subtus pallidius et opacum, c. 15—17 c. longum. 5—4 1 cm. latum. Inflorescentiae ante et pone folium fasciculatae, brevissimae, 1florae, squamis siccis c 0.75 cm. longis cinctae, pedunculis flavescenti-albis, c. 0.6 cm. longis Flos ephemerus, aromatice suaveolens, c 1.6—1.8 cm. latus, sepalis petalisque superne revolutis, flavescentibus, dimidio inferiore grossius, dimidio superiore minute purpureo-punctatis. Sepalum dorsale lanceolatum, apice angustatum, satis acutum, basi latum, convexum, c. 1.35—1.475 cm longum, 0.45—0.475 cm. latum. Sepala lateralia cum pede gynostemii mentum breve cum ovario angulum obtusum faciens formantia, oblique lanceolata, breviter acuta, basi oblique dilatata, convexa, basi concava, c. 1.4—1.475 cm. longa, basi 0.6 - 0.67 cm. lata. Petala inferne gynostemio adpressa et concava, superne convexa, oblique anguste lanceolata, acuta, intus longitudinaliter sulcata, c. 1,3 - 1.5 cm. longa, 0.325—0.34 cm. lata. Labellum in $^{1}/_{4}$ parte supra basin et in $^{2}/_{5}$ partibus infra apicem recurvum, 3lobum, 3costatum, costis exterioribus inter lobos laterales rectis, sectione transversa cuneatis, dorso lato leviter excavatis, flavis, in ungue lobi intermedii angustioribus et valde undulatis, minute rubicunde punctatis et plus minusve dilute viridi marginatis, in lamina lobi intermedii subobsoletis, costa tertia inconspicua interposita, subtus longitudinaliter sulcatum, explanatum c. 1.43 cm., usque ad apicum loborum lateralium 0.725 cm. longum, hypochylio obcordato, basi flavo, ceterum flavescenti-albo, in lobis lateralibus superne purpureo-punctato, c. 0.675 cm lato; lobi laterales erecti, apice libero porrecti, gynostemium superantes, oblique triangulo-ovati, obtusi, apice repanduli, intus papillosi; lobus intermedius magnus, flabellatus, unguiculatus, ungue oblongo-quadrangulo, apicem versus dilatato, repandulo, flavo, minute fusco-purpureo-punctato, c. 0.35—0 375 cm. longo, c. 0.25—0.3 cm. lato, lamina valde abrupte flabellato-dilatata, apicem versus dilatata, transversa, apice truncata leviter retusa cum dente triangulo in sinu, valde irregulariter plicata et sinuata, satis obscure flava, fusco-purpuree maculato-punctata, 0.4—0.5 cm. longa, 1.4—1.45 cm lata. Gynostemium breve, latum, conicum, dorso convexum, flavescens, subtus purpureo-punctatum, c. 0.275—0.3 cm. longum, clinandrio rotundo, excavato, filamento triangulo, acuto, auriculis oblique triangulis vel quadrangulis, margine purpureo-punctatis. Anthera cucullata, subrotundato-quadrangula, apice subcontracta truncato-rotundata puberulaque, alba, c. 0.14 cm. lata. Pollinia 4, linearia, flava. Stigma parvum, rotundato-triangulum, alte excavatum. Pes gynostemii cum gynostemio et etiam cum ovario angulum obtusum faciens, oblongus, apicem versus angustatus, obtusus, concavus, apice excavatus, dorso convexus, flavescenti-albus, purpureo-punctatus, nec-

tario viridiflavo, c. 0. 35--0.4 cm. longus. Ovarium pedicellatum 6sulcatum, nitide flavescens, c. 0.65 – 0.75 cm. longus.

Java? (Kult. in Hort. Bog. II M, b36).

Die Herkunft dieser Pflanze ist unbekannt; vermutlich stammt sie jedoch von Java.

Sie gehört zu den Arten, die häufig für *D. Macraei* LNDL. angesehen wurden. Sie hat jedoch gelbe, braunrot punktierte Blüten, kleine Seitenlappen, einen länger genagelten Mittellappen, einen mit dem Ovarium einen stumpfen Winkel bildenden Säulenfuss, u. s. w.

Beschreibung nach lebenden Exemplaren

Dendrobium puncticulosum J. J. S.

Rhizom verlängert, weit hinkriechend, verzweigt, stielrund, glänzend gelbgrün, bis 0,625 cm dick. Stengel 8—16 cm auseinander gestellt, gut verzweigt, c. 75 cm lang, glänzend grüngelb, braunrot überlaufen; Hauptstengel, stielrund, 29 – 37 cm lang, das Endglied zu einem schief linear lanzettlichen, abgestutzten, zusammengedrückten, c. 5.5 --7 cm langen, 1—1.1 cm breiten, 1blättrigen Trugknollen verdickt, die Zweige dem Hauptstengel ähnlich. Blatt lanzettlich, schmal stumpf, an der Basis kurz zusammengezogen, mit oben gefurchter, unten schmal gekielter Mittelrippe, dünnledrig, grün, unten heller und matt, bis c. 15—17 cm lang, 5—4 cm breit. Blütenstände hinter und vor dem Blatte, büschelig, sehr kurz, 1blütig, von trocknen Schuppen umgeben; Pedunculus gelblichweiss, c. 0.6 cm lang. Blüten eintägig, wohlriechend, die Sepalen und Petalen gelblich, die Lippe gelb, alle braunpurpurn punktiert, die Sepalen und Petalen mit zurückgekrümmter Spitze. Unpaares Sepalum lanzettlich, spitzlich, konvex, 1.35- -1.475 cm lang, 0,45--0.475 cm breit. Paarige Sepalen ein kurzes, mit dem Ovarium einen stumpfen Winkel bildendes Kinn darstellend, schief lanzettlich, an der Basis etwas verbreitert, c. 1.4 – 1.475 cm lang, an der Basis 0.6--0.67 cm breit. Petalen schief und schmal lanzettlich, spitz, c. 1.3—1.5 cm lang, 0.325—0.34 cm breit. Lippe umgebogen, 3lappig, 3rippig, die 2 äusseren Rippen zwischen den Seitenlappen gerade, auf dem Querschnitt keilig, auf dem Nagel des Mittellappens stark wellig und auf der Platte undeutlich, die mittlere Rippe nur schwach, ausgespreizt c. 1.43 cm, bis zur Spitze der Seitenlappen 0.725 cm lang; Hypochil verkehrt herzförmig, an der Basis gelb, weiter gelblichweiss, auf den Seitenlappen purpurn punktiert, 0.675 cm breit; Seitenlappen aufrecht, länger als die Säule, schief dreieckig eirund, stumpf, an der Spitze ausgeschweift, innen papillös; Mittellappen gross, fächerförmig, genagelt, der Nagel länglich viereckig, ausgeschweift, 0.35 – 0.375 cm lang, 0.25—0.3 cm breit, abgebrochen in die an der Spitze verbreiterte, abgestutzte und mit einem Zahn versehene, stark gefaltete und buchtige, 0.4– 0.5 cm lange, 1.4—1.45 cm breite Platte verbreitert. Säule kurz, kegelig, gelblich, unten purpurn punktiert, 0.275 0.3 cm lang; Filament dreieckig; Öhrchen schief dreieckig oder mehr oder weniger viereckig, gezähnelt. Anthere rundlich viereckig, an der Spitze etwas zusammengezogen,

abgestutzt und kurz behaart, weiss, 0.14 cm breit. Pollinien 4, linear, gelb. Narbe rundlich dreieckig. Säulenfuss mit dem Ovarium und der Säule stumpfe Winkel bildend, länglich, gegen die Spitze verschmälert, konkav, gelblichweiss, purpurn punktiert, an der Spitze mit einer grünlichgelben Aushöhlung, 0.3—0.4 cm lang. Ovarium mit dem Stielchen 6furchig, gelblich, 0.65—0.75 cm lang.

* **Dendrobium reflexitepalum** J. J. S. n. sp.

Caules approximati, patentes vel dependentes, rigidi, deinde ramosi et radicantes, valde compressi, serpentini, apice plerumque in partem brevem tenuiorem folia rudimentaria gerentem producti, nitidi, flavo-virides, c. 25—40 cm. longi, cum foliis c. 2.2—2.5 cm. lati, internodiis valde oblique cuneato-triangulis, curvatis, apice obliquis, margine brevissimo ad c. 0.6 cm., margine longissimo ad c. 1.35 cm. longis, basi c. 0.3 cm., apice obliquo ad 1 cm. latis. Folia equitantia, approximata, marginibus contigua vel fere contigua erecto-patentia, valde lateraliter compressa, valde oblique subovato-triangula, marginibus curvata, acuminata, acuta, basi leviter curvata, rigida, carnosa, opaco-viridia, margine superiore ad c. 0.95—1.1 cm., margine inferiore 1.6—2.3 cm. longa, basi 0.9—1.4 cm. lata, superiora decrescentia; vaginae tubulosae, valde lateraliter compressae, apice obliquae, colore laminae, internodia paululum superantes, ad c. 0.55—0.9 cm. latae. Folia rudimentaria caduca, parva, oblique triangula. Inflorescentiae ad nodos partis caulium rudimentariae et ad nodos caulium adultorum plerumque defoliatorum, fasciculares, squamis mox exarescentibus et plus minusve in fibras solutis cinctae, sensim plures flores gignentes. Flores parvi, c. 0.4—0.525 cm. lati, 0.65 cm. longi, sepalis petalisque valde et oblique recurvis, convexis, purpurascentibus, albo-marginatis, sepalis lateralibus dimidiis proximis albis. Sepalum dorsale oblongum, superne angustatum, anguste obtusum, breviter apiculatum. 0.33—0.35 cm. longum, 0.15 cm. latum. Sepala lateralia lacinia oblique oblonga concava ad pedem gynostemii decurrentia, mentum reversum ovario adpressum dorso curvatum obtusum album c. 0.25 cm longum formantia, parte antica oblique oblonga, acutata, vix subacute apiculata, c. 0.33—0.35 cm., tota c. 0.6 cm. longa, 0.17—0.18 cm. lata. Petala oblique lanceolata, acuta, c. 0.3 cm. longa, 0.075 cm. lata. Labellum pedi gynostemii et gynostemio adpressum, liberum, leviter undatum, concavum, angustum, unguiculatum, leviter 3lobum, ecallosum, album, mesochylio ⅓ totius longitudinis purpureo-marginatum, c. 0.6 cm. longum, ungue oblongo, marginibus parallelis, c. 0.2 cm. longo, 0.1 cm. lato, lobis lateralibus basi latis, abbreviatis, mesochylium ovatum interdum medio leviter constrictum a lobo intermedio sinibus latissimis sejunctum c. 0.23 cm. longum 0.175 cm. latum formantibus, lobo intermedio porrecto, ambitu suborbiculari, 2fido cum lobulis porrectis parallelis oblique ovalibus obtusis vel rotundatis, mesochylio paulo angustiore vel aequilato, c. 0.16 cm. longo, 0.15—0.17 cm. lato. Gynostemium rectum, late oblongum, dorso convexum, subtus albidum, dorso purpurascens et striis 3 purpureis basin versus confluentibus notatum, c. 0.13—0.15 cm. longum, clinandrio concavo, filamento anguste

triangulo, auriculis aequilongis, latis, obtusis. Anthera cucullata, antice plana et ambitu subovalis vel suborbicularis, apice rotundato-producta, albida, c. 0.05 cm. lata Pollinia 4, angusta, linearia. subcurvula, semipellucide flava, c. 0.05 cm. longa. Stigma longitudinale, subovale. Pes gynostemii reversus, ovario adpressus, linearis, apice incurvulus, c. 0.24 cm. longus. Ovarium curvulum, 6sulcatum, flavescenti-album, c. 0.2—0.3 cm. longum; pedicellus paulo tenuior, flavescenti-albus, c. 0.35 cm. longus.

Java: Buitenzorg, auf dem Salak. (Kult. in Hort. Bog.).

Priangan, Tjidas Malang, Tjidadap bei Tjibeber in 1000 m ü. d. M. (W. F. WINCKEL, kult. unter n. 340).

Semarang, auf dem Moeriah, am Nordwesthang, in 300 m ü. d. M., epiphytisch im Urwalde. (W. M. DOCTERS VAN LEEUWEN n. 951, bl. im Oktober 1912).

Die Art ist vor *D. aloifolium* RCHB. F., das sie habituell völlig ähnlich sieht und wohl mehrmals für sie angesehen wurde, ausgezeichnet durch etwas grössere, anders gefärbte Blüten, mit einer längeren, an der Spitze breiteren Lippe ohne Schwielen.

Auch *D. rhodostele* RIDL. ist nahe verwandt, unterscheidet sich nach der Beschreibung jedoch durch viel schmälere Blätter, anders gefärbte Blüten, während die Lippe an der Spitze breiter ist als im unteren Teile.

KRÄNZLINs Beschreibung des *D. aloifolium* (im Pflanzenr. II. 50. II.B. 31 (1910), 216) ist, wie ich vermute, z. T. nach dieser Art aufgestellt worden.

Beschreibung nach kultivierten Exemplaren.

Dendrobuim reflexitepalum J. J. S.

Stengel abstehend oder hängend, steif, nachher verzweigt und wurzelnd, stark zusammengedrückt, geschlängelt, an der Spitze meistens in einen kurzen, dünneren, nur rudimentäre Blätter tragenden Teil verlängert, glänzend, gelbgrün, c. 35–40 cm lang, mit den Blättern 2.2—2.5 cm breit, die Internodien sehr schief keilig dreieckig, gekrümmt, mit sehr schiefer Spitze, an der kurzen Seite bis c. 0.6 cm, an der langen Seite bis 1.35 cm lang, an der Basis 0.3 cm, an der Spitze 1 cm breit. Blätter genähert, aufrecht abstehend, stark seitlich zusammengedrückt, sehr schief etwas eirund dreeckig, spitz zugespitzt, fleischig, mattgrün, am oberen Rande 0.95—1.1 cm, am unteren Rande 1.6—2.3 cm lang, an der Basis 0.9—1.4 cm breit, die höheren kleiner; Scheiden röhrig, stark zusammengedrückt, am oberen Rande schief, bis c. 0.55–0.9 cm breit. Rudimentäre Blätter hinfällig, klein, schief dreieckig. Blütenstände am oberen Stengelteil und an den alten, häufig entblätterten Stengeln, büschelig, von bald trocknen und mehr oder weniger in Fasern afgelösten Schuppen umgeben, allmählich mehrere Blüten hervorbringend. Blüten klein, 0.4–0.525 cm breit, 0.65 cm lang, die Sepalen und Petalen stark und schief zurückgebogen, konvex, hellpurpurn, weiss berandet, die einander zugewandten Hälften der paarigen Sepalen weiss. Unpaares Sepalum länglich, schmal stumpf, c. 0.33–0.35

cm lang, 0.15 cm breit. Paarige Sepalen mit einem schief länglichen Streifen am Säulenfuss herablaufend, ein zurückgerichtetes, dem Ovarium angedrücktes, stumpfes, weisses, c. 0.25 cm langes Kinn bildend, die freien Teile schief länglich, kaum mit einem Spitzchen, 0.33—0.35 cm, im ganzen 0.6 cm lang, 0.17 - 0.18 cm breit. Petalen schief lanzettlich, spitz, 0.3 cm lang, 0.075 cm breit. Lippe dem Säulenfuss parallel, frei, konkav, schmal, genagelt, schwach dreilappig, ohne Schwielen, weiss, das Mesochil purpurn berandet, 0.6 cm lang; Nagel länglich, 0.2 cm lang, 0.1 cm breit; Seitenlappen mit breiter Basis, sehr kurz, ein eirundes, bisweilen in der Mitte etwas eingeschnürtes, vom Mittellappen nur durch seichte Buchten getrenntes, 0.23 cm langes, 0.175 cm breites Mesochil darstellend; Mittellappen vorgestreckt, im Umriss nahezu rund, 2spaltig, mit parallelen, schief ovalen, stumpfen Läppchen, dem Mesochil gleich breit oder etwas schmäler, 0.16 cm lang, 0.15—0.17 cm breit. Säule gerade, breit länglich, unten weisslich, auf dem Rücken purpurn gezeichnet, 0.13—0.15 cm lang; Filament dreieckig; Öhrchen gleich lang, breit, stumpf. Anthere kappig, vorn flach und im Umriss oval oder fast rund, an der Spitze etwas vorgezogen, weisslich, 0.05 cm breit. Pollinien 4, schmal linear, durchscheinend gelb, 0.05 cm lang. Narbe nahezu oval. Säulenfuss zurückgerichtet, dem Ovarium angedrückt, linear, an der Spitze etwas eingebogen, 0.24 cm lang. Ovarium gekrümmt, 6furchig, gelblichweiss, 0.2—0.3 cm lang; Stielchen etwas dünner, 0.35 cm lang.

Dendrobium corrugatilobum J. J. S. n. sp.

Caules obtusangule teretes, ad nodos vix constricti, basin apicemque versus attenuati, nitide flavi, c. 36 cm. longi, ad c. 0.4 cm. diam. inferne sensim defoliati, internodiis inferioribus ad c. 1.3 cm. longis, superioribus sensim decrescentibus. Folia basi cauli adpressa, dimidio superiore recurvula, erecto-patentia, oblonga, apicem versus leviter angustata, altius suboblique rotundato-bilobula, emucronata, basi semiamplexicaulia, leviter obtusangule concava, impressione triangula plana apice dorso in costulam longitudinalem producta supra basin, costa media supra sulcata, nitide viridia, dorso nitidula, mediana c. 1.85 cm. longa, 0.62 cm. lata, superiora sensim decrescentia, ad c. 1 cm. longa, 0.35 cm. lata; vaginae tubulosae, internodia aequantes vel paulum superantes, dilute ochrascentes. Inflorescentiae vaginam dorso ad basin perforantes, erectae, breves, laxe 2--3florae, pedunculo virescenti-albido, c. 0.2 cm. longo, nonnullis vaginulis brevibus tubulosis triangulis adpressis donato, rachide flexuosa, colore pedunculi, c. 0.2—0.3 cm. longa. Bracteae adpressae, triangulae, acutae, concavae, c. 0.15—0.25 cm. longae. Flores parvi, c. 1.2 cm. longi, sepalis petalisque leviter divergentibus. Sepalum dorsale subovato-oblongum, dimidio superiore sensim angustatum, acutum, conico-apiculatum, 3nervium, c. 0.65 cm. longum, 0.28 cm. latum. Sepala lateralia lacinia oblique lineari ad pedem gynostemii decurrentia, mentum reversum cum ovario angulum acutum faciens anguste conicum leviter sigmoideum obtusum c. 0.4 cm.

longum formantia, margine antico fere omnino libera, porrecta, subundata, concava, oblique oblonga, acuminata, apiculo conico recurvulo, 4nervia, c. 0.7 cm., margine antico 1.15 cm. longa, basi 0.57 cm. metientia, supra basin c. 0.325 cm. lata. Petala porrecta, spathulata, leviter concava, 3nervia, ungue late lineari, c. 0.275 cm. longo. 0.08 cm. lato, lamina oblonga, apice triangulo-angustata, acutiuscula, erosula, c. 0.35 cm. longa, 0.17 cm. lata. Labellum pedi gynostemii et gynostemio adpressum, undatum, concavum, unguiculatum, 3lobum, basi pedi gynostemii adnatum, subtus longitudinaliter sulcatum, intus e basi unguis fascia longitudinali incrassata basi glabra deinde farinoso-puberula a basi laminae 3costata instructum, costis rectis, parallelis superne valde distinctis glabris sulcis farinoso-puberulis separatis ad basin lobi intermedii terminantibus, costa intermedia quam exteriores paulo longiore, totum explanatum fere 1 1 cm., usque ad apicem loborum lateralium 0.75 cm. longum, ungue lineari basi 1nervio, parte libera 5nervio, c. 0.35 cm. longo, longitudine bene 0.2 cm. pedi gynostemii adnato, medio bene 0.1 cm. lato, lamina e basi cuneata pandurata, c. 0.75 cm. longa, supra basin bene 0.4 cm. lata, parte angusta 0.3 cm. lata; lobi laterales erecti, breves, lati, supra basin rotundato-dilatati, apice breviter oblique triangulo-producti, porrecti, acutiusculi, bene 0.05 cm. longi, gynostemium paulum superantes; lobus intermedius porrectus, cum labelli parte inferiore angulum obtusum faciens, lateribus erectis valde concavus, canosus, valde transverse undulatus, irregulariter lobatus, explanatus angulato-suborbicularis, intus basi medio farinoso-puberulus, c. 0.3 cm. longus, 0.43 cm. latus. Gynostemium subrectum, oblongum, dorso convexum, 0.3 cm. longum, clinandrio alte excavato, apice late truncato, filamento tenuiter filiformi, auriculis porrectis, triangulis, obtusis. Anthera cucullata, antice plana, apicem versus angustata, apice truncata ciliataque, dorso rotundata, omnino papillosa, c. 0.14 cm. lata. Pollinia 4, subaequalia, linearia, supra convexa. Stigma quadrangulum, superne angustatum. Pes gynostemii cum ovario angulum acutum faciens, linearis, canaliculatus, dimidio superiore fere labello adnatus, leviter sigmoideus, c. 0.4 longus. Ovarium obtuse trigonum, 6sulcatum, c. 0.3 cm. longum; pedicellus paulo tenuior, teres, c 0.8 cm. longus.

Java: Priangan, Goenoeng Gombong, Tjadas Malang bei Tjibeber. (W. F. WINCKEL, bl. im Januar 1918).

Eine kleinblättrige, kleinblütige Art der in Java nur schwach vertretenen Sektion *Distichophyllum*. Die Blüten waren bräunlich.

Beschreibung nach einem lebenden Stengel und in Formalin aufbewahrten Blüten.

Dendrobium corrugatilobum J. J. S.

Stengel stumpfkantig rundlich, glänzend gelb, c. 36 cm lang, in der Mitte 0.4 cm dick; die unteren Internodien bis c. 1.3 cm lang, die höheren kürzer. Blätter am Grunde dem Stengel angedrückt, die obere Hälfte etwas

abstehend, länglich, ziemlich tief und abgerundet 2lappig, mit einem flachen, dreieckigen, nach oben in ein Längsrippchen ausgehenden Eindruck über der Basis, mit oben gefurchter Mittelrippe, glänzend, grün, die mittleren c. 1.8 cm lang, 0.62 cm breit, die höheren abnehmend, bis c. 1 cm lang, 0.35 cm breit; Scheiden röhrig, ebenso lang oder etwas länger als die Internodien, hellockergelblich. Blütenstände die Scheide am Grunde durchbohrend, kurz, locker 2–3blütig; Pedunculus grünlichweiss, c. 0.2 cm lang, mit wenigen kurzen, röhrigen, dreieckigen, angedrückten Schaftblättern; Rachis zickzackig, 0.2—0,3 cm lang. Brakteen dreieckig, spitz, konkav, 0.15 - 0.25 cm lang. Blüten klein, c. 1.2 cm lang, die Sepalen und Petalen etwas divergierend. Unpaares Sepalum etwas eirund länglich, spitz, 3nervig, 0.65 cm lang, 0.28 cm breit. Paarige Sepalen mit einem schief linearen Streifen am Säulenfuss herablaufend, ein zurückgerichtetes, mit dem Ovarium einen spitzen Winkel bildendes, schmal kegeliges, schwach Sförmiges, stumpfes, 0.4 cm langes Kinn bildend, schief länglich, zugespitzt, 4nervig, 0,7 cm, am Vorderrande 1.15 cm lang, an der Basis 0.57 cm, über der Basis 0.325 cm breit. Petalen spatelig, 3nervig, der Nagel breit linear, 0.275 cm lang, 0,08 cm breit, die Platte länglich, dreieckig verschmälert, spitzlich, ausgefressen, 0.35 cm lang, 0.17 cm breit. Lippe der Säule und dem Säulenfuss angedrückt, wogig, konkav, genagelt, 3lappig, am Grunde dem Säulenfuss angewachsen, unten mit einer Längsfurche, innen vom Grunde an mit einem verdickten, am Grunde kahlen, dann mehlig behaarten, am Grunde der Platte in 3 gerade, kahle, von mehlig behaarten Rinnen getrennte, an der Basis des Mittellappens endigende Längsrippen aufgelösten Längsbande, ausgespreizt nahezu 1.1 cm, bis zur Spitze der Seitenlappen 0.75 cm lang; Nagel linear, 0.35 cm lang, der dem Säulenfuss angewachsene Teil 0.2 cm lang und 1nervig, der freie Teil 5nervig, 0.1 cm breit; Platte aus keiligem Grunde geigenförmig, 0,75 cm lang, über der Basis 0.4 cm, in der Mitte 0.3 cm breit; Seitenlappen aufrecht, kurz, breit, über der Basis abgerundet verbreitert, vorn in eine kurze, schief dreieckige, spitze, 0.05 cm lange, freie Spitze vorgezogen; Mittellappen durch aufwärts gebogene Seiten stark konkav, stark wellig, unregelmässig gelappt, ausgespreizt quer eckig rundlich, sehr stumpf, innen in der Mitte am Grunde mehlig behaart, 0.3 cm lang, 0.43 cm breit Säule länglich, 0.3 cm lang; Clinandrium tief ausgehöhlt, an der Spitze abgestutzt; Öhrchen dreieckig, stumpf. Anthere kappig, papillös, vorn flach, gegen die Spitze verschmälert, abgestutzt, gewimpert. Pollinien 4, linear. Narbe viereckig, nach oben verschmälert. Säulenfuss mit dem Ovarium einen spitzen Winkel bildend, linear, rinnig, die obere Hälfte der Lippe angewachsen, 0.4 cm lang. Ovarium 0.3 cm lang; Stielchen 0.8 cm lang.

Cymbidium sundaicum SCHLTR. in FEDDE Rep Beih. IV (1919), 226. – *Cymbidium ensifolium* J. J. S. in Fl. Buit. VI, Orch. (1905), 478; Atlas Fig. CCCLXIV.

Dr. SCHLECHTER hat l.c. die javanische Pflanze unter obigem Namen von der chinesischen Art abgetrennt. Wiewohl ich kein chinesisches Material gesehen habe, scheint es mir doch etwas zweifelhaft ob seine Ansicht die richtige sein kann, da *C. ensifolium* SW., wie sie in Bot. Reg XXIII (1837), t. 1976 abgebildet ist, kaum von der javanischen Pflanze zu unterscheiden ist, nur scheint sie kleiner zu sein. SCHLECHTER verabsäumt die Unterschiede zwischen den beiden Pflanzen anzugeben.

Cymbidium chloranthum LNDL. in Bot. Reg. XXIX (1843), Misc. p. 68; in Bot. Mag. LXXXII (1856), t. 4907; ROLFE in Orch. Rev. XXVII (1919), 128.— *C. variciferum* RCHB. F. in Bonpl. II (1854), 91.— *C. sanguinolentum* T. et B. in Nat. Tijdschr. Ned. Ind. XXIV (1861), 318; J. J. S. in Fl. Buit. VI, Orch. (1905), 479; Atlas Fig. CCCLXV.

Herr R. A. ROLFE hat herausgestellt, dass die drei oben erwähnten Namen, von welchen *C. chloranthum* LNDL. der älteste ist, nur einer Art angehören.

Phreatia secunda LNDL. Gen. et sp. Orch. (1830), 64; MIQ. Fl. Ind. Bat. III (1855), 656; J. J. S. in Fl. Buit. VI, Orch. (1905), 500; Atlas Fig. CCCLXXVIII; KRZL. in Pflanzenr. IV. 50. II. B. 23 (1911), 25.— *Ph. microtidis* LNDL. in Journ. Linn. Soc. III (1859), 69; MIQ. l. c. 655. — *Dendrolirium secundum* BL. Bijdr. (1825), 350.— *Eria secunda* RCHB. F. in Bonpl. V (1857), 54.

* var. **tenuiscapa** J. J. S. n. var.

Pusilla. Caulis abbreviatus, 6—11folius, radicibus tenuibus. Folia patentia, infima patentissima, lineari-lanceolata ad linearia, apice brevissime inaequaliter obtuse bilobula cum mucrone obtuso paulo longiore, basi manifeste et sensim angustata, supra obtusangule vel acutangule canaliculata, subtus angulato-convexa, carnosa, dilute viridia, supra nitidula, subtus opaca, c. 1.75—3.7 cm. longa, 0.375—0.46 cm. lata.; vaginae breves, amplectentes, tubulosae, antice rumpentes, semipellucidae, pallide virides, albido-nervosae, basi folii latiores, c. 0.5—0.8 cm. longae. Inflorescentiae axillares, foliis breviores vel longiores, laxe multiflorae, secundae, pedunculo tenuiusculo, leviter compresso, sectione transversa ovali, furfuraceo-punctato, c. 0.85—1.5 cm. longo, nonnullis vaginulis tubulosis acuminatis carinatis donato, rachide valde interrupte et abrupte angulata, dilute viridi, furfuraceo-punctata, c. 1—3.5 cm. longa. Bracteae rhombeae, sensim longe acuminatae, acutissimae, ad c. 0.3 cm. longae. Flores parvi, pulvinis inserti, quaquaversi, sursum curvi, bene aperti, pallide virescentes, c. 0.2 cm. lati. Sepalum dorsale triangulum, anguste obtusum, convexum, c. 0.12 cm. longum, 0.075 cm. latum. Sepala laterialia oblique ovato-triangula, acuminata, acutiuscula, apice canaliculata, bene 0.1 cm. longa, 0.08 cm. lata. Petala patentissima, oblique oblongo-ovata, c. 0.075 cm. longa, 0.04 cm. lata. Labellum porrectum, concavum, apice interdum canaliculato-recurvulum, explanatum orbiculari-subsexangulatum vel cuneato-sexangulatum, apice latum, retusum, interdum obtuse apiculatum, glabrum, breviter 3nervium, c. 0.1 cm. longum et latum. Gynostemium brevissimum, clinandrio concavo, truncato, filamento porrecto, subulato. Anthera cucullata, angulato-reniformis, apice breviter triangulo-producta, basi altius biloba, c. 0.03 cm. lata. Rostellum brevissimum. Stigma transversum. Pes gynostemii brevissimus. Ovarium pallide viride, cum pedicello tenuiore albido clavatum, dorso c. 0.15 cm. longum. Fructus erectus, oblongo-obovoideus, subcylindricus, vix 6angulatus, nitidus, dilute viridis, c. 0.3 cm. longus, pedicello 0.075 cm. longo.

Java: Priangan, Tjipateungteung bei Tjibeber in c. 1000 m ü. d. M. (W. F. WINCKEL, bl. im Juli 1917, kult. unter n. 157). Goenoeng Beser in 1100 m ü. d. M. (W. F. WINCKEL, bl. im September 1916.

Diese Pflanze habe ich vorläufig als eine Varietät der *Ph. secunda* LNDL. betrachtet. Ich vermute jedoch, dass wenn mehr Material vorliegt, sie sich vielleicht als eigene Art erweisen wird. Sie underscheidet sich von *Ph. secunda* durch dünnere, am Grunde gut verschmälerte Blätter und einen schmäleren, weniger zusammengedrückten, nicht schwertförmigen Pedunculus.

Phreatia secunda LNDL. var. *tenuiscapa* J. J. S.

Kleine Pflanze. Stengel sehr kurz, c. 6--11blättrig, mit dünnen Wurzeln. Blätter abstehend, die unteren weit abstehend, linear lanzettlich bis linear, an der Spitze sehr kurz ungleich stumpf 2lappig mit einem stumpfen, etwas längeren Spitzchen, am Grunde deutlich und allmählich verschmälert, stumpf- oder spitzwinkelig rinnig, unten eckig konvex, fleischig, hellgrün, oben schwach glänzend, unten matt, c. 1.75--3.7 cm lang, 0.375--0.46 cm breit; Scheiden kurz, einander umfassend, röhrig, vorn aufreissend, etwas durchscheinend, blassgrün, mit weisslichen Nerven, breiter als die Blattbasis, c. 0.5--0.8 cm lang. Blütenstände blattwinkelständig, kürzer oder länger als die Blätter, locker vielblütig, einseitswendig; Pedunculus ziemlich dünn, schwach zusammengedrückt, auf dem Querschnitt oval, kleiig punktiert, c. 0.85--1.5 cm lang, mit wenigen röhrigen, zugespitzten, gekielten Schaftblättern; Rachis stark unterbrochen kantig, hellgrün, punktiert, 0.1—3.5 cm lang. Brakteen rautenförmig, allmählich lang zugespitzt, sehr spitz, bis 0.3 cm lang. Blüten klein, auf den vorspringenden Kanten der Rachis inseriert, zurückgerichtet, aufwärts gebogen, gut geöffnet, blass grünlich, c. 0.2 cm breit. Unpaares Sepalum dreieckig, schmal stumpf, konvex, c. 0.12 cm lang, 0.075 cm breit. Paarige Sepalen schief eirund dreieckig, zugespitzt, spitzlich, an der Spitze rinnig (stets?), gut 0.1 cm lang, 0.08 cm breit. Petalen weit abstehend, schief länglich eirund, spitz, c. 0.075 cm lang, 0.04 cm breit. Lippe vorgestreckt, konkav, an der Spitze bisweilen rinnig zurückgebogen, ausgespreizt rundlich 6eckig oder keilig 6eckig, mit breiter, eingedrückter und bisweilen mit einem stumpfen Spitzchen versehener Spitze, kahl, kurz 3nervig, c, 0.1 cm lang und breit. Säule sehr kurz; Clinandrium konkav, abgestutzt; Filament vorgestreckt, pfriemlich. Anthere kappig, eckig nierenförmig, an der Spitze kurz dreieckig vorgezogen, an der Basis ziemlich tief 2lappig, c. 0.03 cm breit. Rostellum sehr kurz. Narbe quer. Säulenfuss sehr kurz. Ovarium blassgrün, mit dem dün-

neren, weisslichen Stielchen keulig, am Rücken c. 0.15 cm lang. Frucht aufrecht, länglich verkehrt eiförmig, nahezu zylindrisch, kaum 6kantig, glänzend, hellgrün, c. 0.3 cm lang; Stielchen 0.075 cm lang.

* **Phalaenopsis fimbriata** J. J. S. n. sp.

Caulis abbreviatus, c. 5folius, radicibus elongatis, rigidis, serpentinis, apice viridibus. Folia subpatentissima, elliptico-oblonga vel interdum apicem versus paulum dilatata, superne recurva, brevissime oblique subacuta vel uno latere anguste obtusa, leviter laxe undulata, costa media supra canaliculata subtus acute carinata, tenuiter carnosa, utrinque nitide viridia, c. 14.5—23 cm. longa, 4.1—6.75 cm. lata; vaginae breves, tubulosae, antice rumpentes, opace virides, internodia superantes. Inflorescentiae patentissimae, plus minusve decurvae, simplices (an semper?), laxe pluri-multiflorae, pedunculo tereti, viridi, c. 9—11.5 cm. longo, vaginulis c. 3 brevibus tubulosis donato, rachide obtuse quadrangula, viridi, c. 6—15 cm. longa. Bracteae alternatim bifariae, persistentes, parvae, rachidem semiamplectentes, pedicello adpressae, triangulae, obtusae, concavae, dorso carinatae, carina apice acutae, virides, pallide marginatae, ad c. 0.5 cm. longae. Flores c. 5—17 vel plures, simultanee aperti, patentes, mediocres, valde aperti, diu viriditatem conservantes, carnosuli, odore leviter aromatico, c. 2.6 cm. lati, sepalis petalisque patentissimis, incurvulis, albis, praesertim adultis superne pallide virescentibus. Sepalum dorsale oblongo-ellipticum, apice obtusum recurvulum, basi leviter contractum, c. 1.9—2 cm. longum, 0.95—0.75 cm. latum. Sepala lateralia divergentia, breviter ad pedem gynostemii decurrentia, oblique ovata, inaequilatera, apicem versus angustata, apice recurva, acuta, apiculata, convexa cum canalicula longitudinali, dorso carinata, basi nonnullis striis transversis dilute purpureis notata, c. 1.8—2 cm. longa, 1.15—1 cm. lata. Petala incurvula, e basi cuneata oblongo-elliptica, obtusa vel subacuta, margine apicali incurva, convexa, c. 1.8 cm. longa, 0.95—0.8 cm. lata. Labellum ungue brevi transverse quadrangulo albo pedi gynostemii insertum et cum eo angulum obtusum faciens, 3lobum, supra basin in medio basis loborum lateralium obtusangule incurvum, parte antica gynostemio parallelum, inexplanatum c. 1.5 cm. longum, explanatum c. 1.6 cm. longum, ad lobos laterales 1.25 cm. latum, disco inter lobos laterales appendices 3 subimbricantes decumbentes inferne adnatas in dentes ± 2 subulatos liberos porrectos exeuntes donato, appendice antica inferioribus longiore cum dentibus satis longis divergentibus basin lobi intermedii superantibus, vel appendicibus irregulariter lacinulatis; lobi laterales sub gynostemio erecti, paralleli, oblique quadrangulo-oblongi, basi dilatati, apice falcato-recurvi et acuti, margine apicali crenulati, basi apiceque intus concavi extus convexi, medio intus convexi extus concavi, intus medio callo conspicuo longitudinali inferne oblique decurrente superne in costulam marginalem apice in angulo antico in lobulum triangulum obtusangule incurvum dilatatam producto ornati, eo specie dorso carinati, albi, apice margine postico excepto et basi margine antico dilute purpurei, margine antico medio aurei, c. 0.5 cm. longi, basi 0.3 cm. lati; lobus intermedius porrectus, ambitu oblongo-obovato-rhombeus, carnosus, valde convexus, subtus concavus cum sulco longitudinali, partibus c. $^2/_5$ — $^1/_2$ inferioribus cuneato-quadrangulus, margine basi utrinque anguste incurvus, deinde utrinque tenuiter et rotundato-dilatatus, margine incurvulus et breviter fimbriatus, apice triangulo-contractus incurvulus acutus integerrimus et subtus plus minusve calloso-incrassatus, carina e basi humili bene elavata deinde humiliata irregulariter crenata et dentata in parte dilatata altissima incrassata muriculata et pilis longis albis villosa, interdum superne utrinque costa humiliore addita, purpureus, inferne striis 3 marginibusque pallide purpurascentibus, parte dilatata costa excepta albus, c. 1.2 cm. longus, superne 0.6 cm. latus. Gynostemium, rectum, basi valde constrictum, apice valde triangulo-productum et crenulatum, album, absque anthera c. 0.7 cm. longum, auriculis latis obtusis cum dente angusto. Anthera cucullata, oblique conica, antice visa subrhombea, costis validis aliformibus divergentibus basi apiceque conniventibus irregulariter marginatis antice concava, apice brevissime contracto-producta obtusa et retusa, connectivo basin versus in dorso breviter producto obtuso interdum tricrenulato, alba, c. 0.225 cm. lata. Pollinia 2, ovalia, dorso $^2/_3$ partibus inferioribus longitudinaliter fissa, pallide flava, cum stipite spathulato apice rotundato antice convexo albo et glandula suborbiculari c. 0.4 cm. longa. Rostellum recurvum, alte bipartitum, laciniis subulatis. Stigma magnum, alte excavatum. Pes gynostemii cum ovario angulum subrectum faciens, apice tantum liber, rectus, basi incrassatus, a latere visus triangulus, albus, c. 0.35 cm. longus. Ovarium pedicellatum teres, superne sulcatum, album, c. 2.5 cm. longum.

Java: Blitar, in den Wäldern. (E. TOLLENS, leb. Pfl.)

Die Art gehört zu den Verwandten der *Ph. sumatrana* KORTH. Sie ist ausgezeichnet durch die bei starken Pflanzen vielblütigen Blütenstände ziemlich kleiner, zu gleicher Zeit blühender, leicht aromatisch riechender, sich lange haltender Blüten. Der Mittellappen der Lippe ist nach vorne hin kurz fransig, das Haarpolster ist nur schmal und die Haare sind auf fleischigen Verdickungen, die bisweilen zu Weichstacheln auswachsen, eingepflanzt.

Beschreibung nach lebenden, mir von Herrn E. TOLLENS zugeschickten Blütenständen und einer von Herrn M. C. VALK in Soerabaja erhaltenen lebenden Pflanze.

Phalaenopsis fimbriata J. J. S.

Stengel kurz, c. 5blättrig. Blätter länglich elliptisch, bisweilen nach oben hin etwas verbreitert, sehr kurz und ungleich spitzlich oder schmal stumpf, unten gekielt, dünn fleischig, glänzend grün, c. 14.5—23 cm lang, 4.1—6.75 cm breit; Scheiden kurz, röhrig. Blütenstände weit abstehend, unverzweigt, locker mehr- bis vielblütig; Pedunculus c. 9—11.5 cm lang, mit c. 3 kleinen Schaftblättern; Rachis stumpf vierkantig, c. 6—15 cm lang. Brakteen 2zeilig, klein, dreieckig, stumpf, konkav, unten gekielt, bis c. 0.5 cm lang. Blüten 5—17 oder mehr, zugleicher Zeit geöffnet, abstehend, mittelgross, sich lange haltend, etwas fleischig, mit leicht aromatischem

Geruch, c. 2.6 cm breit, die Sepalen und Petalen weiss, besonders die älteren nach oben hin blassgrünlich. Unpaares Sepalum länglich-elliptisch, mit zurückgebogener, stumpfer Spitze, an der Basis etwas zusammengezogen, c. 1.9—2 cm lang, 0.95—0.75 cm breit. Paarige Sepalen kurz am Säulenfuss herablaufend, schief eirund, an der Spitze zurückgebogen, spitz, mit einem Spitzchen, konvex mit einer Längsrinne, unten gekielt, an der Basis mit einigen hellpurpurnen Querstreifen, c. 1.8—2 cm lang, 1.15—1 cm breit. Petalen aus keiliger Basis schief länglich elliptisch, stumpf oder spitzlich, konvex, c. 1.8 cm lang, 0.95—0.8 cm breit. Lippe mit kurzem, quervierecktigem, weissem Nagel inseriert, mit dem Säulenfuss einen stumpfen Winkel bildend, 3lappig, überhalb der Basis stumpfwinkelig eingebogen, c. 1.5 cm, ausgespreizt 1.6 cm lang, 1.25 cm breit, zwischen den Seitenlappen mit c. 3 niederliegenden, dachigen, an der Spitze freien und in c. 2 freie, pfriemliche Zähne geteilten Anhängseln, das vordere Anhängsel länger als die anderen, oder auch die Anhängsel unregelmässig zerschlitzt; Seitenlappen aufrecht, schief viereckig länglich, am Grunde verbreitert, an der Spitze sichelig zurückgebogen und spitz, der apikale Rand fein gekerbt, innen in der Mitte mit einer grossen, nach unten schief herablaufenden, nach oben in ein randständiges, an der Spitze in ein dreieckiges Läppchen verbreitertes Rippchen verlängerten Verdickung, weiss, an der Spitze und Basis mit purpurn gezeichnet, der Vorderrand in der Mitte goldgelb, c. 0.5 cm lang; Mittellappen der Säule parallel, im Umriss verkehrt eirund rautenförmig, fleischig, stark konvex, unten konkav, der untere Teil keilig 4eckig mit am Grunde schmal eingebogenem Rande, nach oben hin beiderseits leicht abgerundet verbreitert mit dünnem, kurzfransigem Rande, an der Spitze dreieckig zusammengezogen, eingebogen, spitz, ganzrandig und unten mehr oder weniger verdickt, innen mit einem aus niedriger Basis erhabenen, in der Mitte wieder niedrigen, unregelmässig gekerbten und gezähnten, auf dem verbreiterten Teil stark erhabenen, verdickten, weichstacheligen und durch langen, weissen Haaren zottigen Längskiel, bisweilen nach oben beiderseits mit einer niedrigeren Längsrippe, purpurn, nach unten mit den Rändern und 3 Längsstrichen blasspurpurn, der vordere Teil ausser dem Kiel weiss, c. 1.2 cm lang, 0.6 cm breit. Säule gerade, am Grunde zusammengezogen, mit dreieckig vorgezogener und fein gekerbter Spitze, weiss, ohne Anthere 0.7 cm lang, mit breiten, stumpfen, mit einem schmalen Zahn versehenen Öhrchen. Anthere kappig, schief kegelig, von vorne gesehen ungefähr rautenförmig, mit 2 starken, flügeligen, an der Basis und Spitze zusammenlaufenden, unregelmässig berandeten Längskämmen, an der Spitze sehr kurz zusammengezogen, stumpf und ausgerandet, das Konnektiv gegen die Basis kurz vorgezogen, weiss, c. 0.225 cm breit. Pollinien 2, oval, auf dem Rücken gespalten, blassgelb, mit dem spateligen, an der Spitze abgerundeten, vorn konvexen, weissen Stielchen und der nahezu runden Klebmasse c. 0.4 cm lang. Rostellum tief in 2 pfriemliche Lazinien geteilt. Stigma gross. Säulenfuss mit dem Ovarium einen nahezu rechten Winkel bildend, nur an der Spitze von den paarigen Sepalen frei, gerade, am Grunde verdickt, gegen die Spitze verschmälert und verdünnt, weiss, c. 0.35 cm lang. Ovarium mit dem Stielchen weiss, c. 2.5 cm lang.

THRIXSPERMUM LOUR. sectio DENROCOLLA.

Es giebt unter den *Orchideen* sicher wenige Gruppen, die, was die Blüten anbelangt, nach Herbar, besonders wenn das Material etwas stark gepresst oder nicht ganz neu eingelegt ist, so schwierig zu untersuchen und zu bestimmen sind als die Sektion *Dendrocolla* der Gattung *Thrixspermum*, und ganz besonders diejenigen Arten, die sich um *Th. Hystrix* RCHB. F. gruppieren. Nicht nur sind die Blüten ausserordentlich zart und vergänglich, sondern sie sehen einander äusserlich auch sehr ähnlich. Daran ist es wohl z. T. zuzuschreiben, dass die verschiedensten Arten häufig mit dem nämlichen Namen, meistens *Th. Hystrix* RCHB. F., belegt worden sind. Nicht weniger hat sicher die Methode der kurzen Beschreibungen zu diesem Wirrwarr beigetragen.

Die älteste und in diesem Augenblick wohl auch die meist zweifelhafte Art wurde von BLUME unter dem Namen *Dendrocolla Histrix* mit wenigen Zeilen beschrieben. Besonders in den letzten Jahren hat es sich herausgestellt, dass Java eine ganze Reihe mit *D. Histrix* verwandter aber gut charakterisierter Arten beherbergt, die ich alle lebend habe untersuchen können. Welche dieser Arten mit *D. Histrix* zusammenfällt, ist jedoch nicht leicht zu entscheiden.

BLUME giebt in den „Bijdragen" unter *Dendrocolla Histrix* an: „ad arbores circa Buitenzorg". Aus der nächsten Umgebung von Buitenzorg sind mir jedoch zwei Arten mit behaartem Labellum bekannt, so dass die Angabe keine Aufklärung giebt. Ausserdem sind diese beiden Arten habituell sehr verschieden von einem üppigen, mir freundlichst vom Direktor des Leidener Herbariums leihweise zugeschickten BLUMEschen Originalexemplar, das jedoch keine nähere Fundortsangabe trägt und völlig übereinstimmt mit einer früher von Leiden erhaltenen Dublette. Diese beiden Exemplare sind leider blütenlos und, wie DR. J. W. C. GOETHART neulich mitteilte, in Leiden findet sich kein einziges BLUMEsches Original mit der Angabe, dass es von Buitenzorg stamme. Dagegenüber steht, dass ich von Ost-Java einige Male Exemplare einer Art zugeschickt bekam, die sich habituell in nichts von den BLUMEschen Originalen unterscheiden und die ich anfangs für eine nene Art gehalten habe. Ich glaube also der Fundortsangabe „Buitenzorg" einen nicht zu grossen Wert beimessen zu müssen und die ostjavanische Art als mit *D. Histrix* identisch ansehen zu dürfen. Zwar ist auch südlich von Tjiandjoer eine Art gesammelt worden, die grosse habituelle Ähnlichkeit mit dem erwähnten BLUMEschen Original zeigt, aber sie ist doch verschieden durch estwas mehr abstehende Brakteen.

Der Name *Thrixspermum histrix* RCHB. F. erscheint zuerst mit? in Transact. Linn. Soc. XXX (1874), 136, und zwar in einer Liste von Moulmein stammender Orchideen. REICHENBACH giebt *Dendrocolla Histrix* BL. als Synonym, giebt aber keine Beschreibung und erwähnt auf S. 145 nur Mergui (GRIFFITH n. 1066) als Fundort. Es scheint mir ziemlich unwahrscheinlich, dass die REICHENBACHsche Art auch in Java vorkomme und ich glaube daher den Namen REICHENBACHs als ein nomen nudum ansehen zu dürfen. Meine Beschreibung in Fl. Buit. ist wenigstens nach zwei Arten aufgestellt worden und also auch zu verwerfen.

Nach diesen Überwegungen kommt es mir am besten vor die Pflanze, die ich für *Dendrocolla Histrix* BL halte, unter einem neuen Namen aufzuführen. Ein Studium von allem in Leiden vorhandenen Material kann vielleicht noch einige Aufklärung bringen.

Von besonderer Wichtigkeit für die Bestimmung der Arten sind die Länge der Blütenstände, die Form und Stand der Brakteen, die Behaarung, Form und Grösse der Seiten- und Mittellappen, des Spornes und des Callus der Lippe, wie auch deren Zeichnung, und schliesslich die Form der Pollinien.

Einen Bestimmungsschlüssel der bis jetzt von Java sicher bekannten Arten der Sektion *Dendrocolla* lasse ich folgen. Die Arten der SCHLECHTERschen Sektion *Katocolla*, die ich in „Die Orchideen van Java" unter *Dendrocolla* behandelt habe, sind in dieser Tabelle nicht aufgenommen.

1. Lippe unbehaart; Seitenlappen schmal, sichelig. . . . . *Th. batuense* J. J. S. var. *javanicum* J. J. S.
Lippe behaart; Seitenlappen breit . . . . 2.
2. Lippe mit 3 Haarpolstern, kaum sackig. . . . *Th. comans* J. J. S.
Lippe innen nicht mit Haarpolstern, sondern wenigstens nach vorne behaart. . 3.
3. Haare der Lippe an der Spitze nicht verdickt; Callus kegelig, spitz. . . *Th. conigerum* J. J. S.
Köpfchenhaare. Callus stumpf oder eingedrückt. . . . . 4.
4. Haare der Lippe ungefähr gleich lang. . . . . 5.
Haare der Seitenlappen bedeutend länger als die des Mittellappens. . . 6.
5. Blütenstände viel länger als die Blätter. Sporn breit eingedrückt. Pollinien schief oval. . . . . *Th. acutilobum* J. J. S.
Blütenstände kürzer als die Blätter. Sporn wenig eingedrückt. Pollinien dreieckig. . . . . *Th. javanicum* J. J. S.
6. Seitenlappen ziemlich schmal, schwach dreieckig, ausgespreizt länger als der sehr kurze Mittellappen. Brakteen sehr kurz, dreieckig, 0.2 cm lang. . . *Th. malayanum* J. J. S.
Seitenlappen breit dreieckig bis fast viereckig, ausgespreizt ebenso lang oder kürzer als der Mittellappen. Brakteen pfriemlich, wenigstens 0.35 cm. lang . 7.
7. Brakteen weit abstehend bis zurückgebogen . . *Th. squarrosum* J. J. S.
Brakteen anliegend oder abstehend. . . . . 8.
8. Blätter schmal, 0.6—0.8 cm breit. Nahezu die ganze Lippe braun gefleckt. Sporn eingedrückt . . . . *Th. patens* J. J. S.
Blätter 1.3—2 cm breit. Blütenstände stets kurz. Lippe nur an der Spitze gelb oder bräunlich gelb punktiert. Sporn nicht eingedrückt. *Th. trichoglottis* O. K.

Es werden für das Malaiische Gebiet noch einige Arten angegeben, deren Beschreibungen jedoch nicht stets scharf genug sind um mit Sicherheit zu entscheiden, ob vielleicht eine oder mehrere dieser Arten mit den hier beschriebenen javanischen Spezies zusammenfallen.

***Thrixspermum conigerum** J. J. S. n. sp.

Caules elongati, haud vel vix ramosi, sectione transversa elliptici, dilute virides, ad c. 20 cm. longi, internodiis c. 0 8 - 1.4 cm. longis, basi ad c.

0.27 cm., apice 0.35 cm. latis, radicibus fere e medio internodii supra inflorescentias ortis, solitariis. Folia patentissima, interdum plus minusve recurva, loriformia, apice saepe longitudine c. 0.7—1 cm. plus minusve contracta, inaequaliter biloba, basi angustata; obtusangule canaliculata, subtus obtusangule convexa, costa media supra sulcata subtus apice tantum subcarinata, carnosa, nitidule viridia, sordide violaceo-maculata, c. 7—9.5 cm. longa, 0.9—1.4 cm. lata, vaginae tubulosae, sectione transversa ellipticae, dilute virides, violaceo-punctatae, c. 0.45—0.5 cm. latae. Inflorescentiae vaginam dorso perforantes, 1—3 superimpositae, novellae infimae, apice dense multiflorae, diu florentes, pedunculo filiformi, tereti, pallide viridi, valde sordide violaceo-suffuso et maculato, c. 5.5—21 cm. longo, c. 0.1 cm. diam, apice ad c. 0.27 cm. incrassato, vaginulis 2 tubulosis brevibus donato, rachide incrassata, brevi, ad c. 2 cm. longa, cum bracteis c. 0.45 cm. diam. Bracteae quaquaversae, quinqueseriales, erectae, subadpressae, imbricatae, e basi late triangulo-dilatata concava subulatae, acutae, carinatae, dilute sordide virides, valde violaceo-suffusae, c. 0.4 cm. longae. Flores intervallis aperti, ephemeri, mediocres, c. 1.65—2 cm. lati, sepalis petalisque pallide flavescentibus, sepalis dorso leviter purpurascentibus. Sepalum dorsale e basi unguiculato-contracta ovato-ellipticum, subacutum, concavum, c. 1.1 cm. longum, basi c. 0.24 cm., superne 0.4—0.46 cm. latum. Sepala lateralia divaricata, oblique rhombea, basi unguiculato-contracta, apice acuta, concava, costa media dorso incrassata, fere 1.1 cm. longa, 0.53—0.57 cm. lata. Petala angustiora, oblique spathulata, basi linearia, apice obtusa vel obtusiuscula, leviter concava, basi convexa, c. 1 cm. longa, inferne c. 0.16 cm., superne 0.25—0.275 cm. lata. Labellum basi lata pedi gynostemii adnatum, 3lobum, calcaratum, antice in c. $^2/_3$ partibus supra apicem calcaris obtusangule recurvum, intus inter lobos laterales callo conico erecto inclinato glabro instructum, ab apice lobi intermedii usque ad apicem ovarii cum pilis c. 0.8 cm. longum, verticaliter c. 1.15 cm. metiens, 0.55 cm. latum, explanatum cum calcari c. 0.975 cm. longum, 1.4 cm. latum; lobi laterales erecti, supra gynostemium incurvi et plus minusve contigui, late oblique subtrianguli fere quadranguli, obtusissimi, margine postico rotundati, margine antico truncati et subcrenati, concavi, basi excepta pilis longis grossiusculis rectis non clavatis ciliati, intus pilis raris donati, extus minute papillosi, albidi, extus superne cinnamomee maculati; lobus intermedius porrectus, parvus, late triangulus, concavus, subtus vix obtusangule incrassatus, more loborum lateralium ciliatus, extus minute papillosus, albus, extus cinnamomee maculatus, explanatus semiellipticus, obtusus, obtuse subapiculatus, c. 0.15 cm. longus, 0.25 cm. latus; calcar saccatum, deorsum spectans, dorso pedem gynostemii cum ovario angulum subrectum facientem continuum, late oblongum, late obturum, retusum, antice longitudinaliter sulcatum, obtusum. flavescens, usque ad apicem pedis gynostemii c. 0.5—0.575 cm., usque ad apicem ovarii 0.7 cm., longum, 0.425 cm. latum, pariete antico intus costa longitudinali a callo decurrente piloso instructum, apice intus dilute cinnamomee maculatum. Gynostemium breve, oblique conicum, album, c. 0.25—0.3 cm. longum, clinandrio suborbiculari, apice truncato

et minute crenulato. Anthera cuculata, ambitu subquinquangulari-orbicularis, apicem versus dilatata, obtusissima, retusa cum denticulo minuto, basi bilobula, thecis canalicula separatis, tenuis, alba, c. 0.16 cm. lata. Pollinia 4, inaequalia, a dorso compressa, oblique oblongo-ovata, obtusa, albida, 2 postica quam antica bene minora, caudicula stipiti brevi ovato apice brevissime libero semipellucido albo inserta, glandula parva curvata, tota c. 0 16 cm. longa. Rostellum brevissimum, emarginatum. Stigma alte excavatum, transversum. Pes gynostemii cum ovario angulum subrectum faciens, rectus, subquadrangulus, concavus, c. 0.25 cm. longus. Ovarium pedicellatum 6sulcatum, pallide viride vel flavescens, c. 1 cm. longum.

Java: Priangan, Garoet, Pangentjongan, in c. 1500 m ü. d. M., an alten Kaffeebäumen. (J. J. SMITH, bl. im Dezember 1905). Pateungteung in c. 1400 m. ü. d. M., im Urwalde (W. M. DOCTERS VAN LEEUWEN, leb. Pfl. gemischt mit n. 2614, kult. in Hort. J. J. SMITH).

Die hier aufgestellte Art ist vor allen anderen javanischen Verwandten leicht dadurch kenntlich, dass die Haare der Lippe nicht keulig verdickt sind, während der Callus auf der Innenseite kegelig, bei den anderen Arten breit und stumpf ist. Bemerkenswert sind auch die aufrechten Brakteen.

Thrixspermum conigerum J. J. S.

Stengel auf den Querschnitt elliptisch, bis c. 20 cm lang, die Internodien c. 0.8—1.4 cm lang, bis 0.35 cm breit. Blätter weit abstehend, bisweilen mehr oder weniger zurückgebogen, riemenförmig, an der Spitze meistens mehr oder weniger zusammengezogen und ungleich 2lappig, stumpfwinkelig rinnig, unten stumpfwinkelig konvex und nur an der Spitze etwas gekielt, fleischig, schwach glänzend, grün, schmutzig violett gefleckt, c. 7—9.5 cm lang, 0.9—1.4 cm breit; Scheiden röhrig, auf dem Querschnitt elliptisch, 0.45—0.5 cm breit; Blütenstände die Scheide am Grunde durchbohrend, 1—3 übereinander gestellt, an der Spitze dicht vielblütig, lange fortblühend; Pedunculus fadenförmig, blassgrün und violett, c. 5.5—21 cm lang, an der Spitze verdickt; Rachis verdickt, kurz, bis c. 2 cm lang, mit den Brakteen c. 0.45 cm im Durchmesser. Brakteen allseitswendig, aufrecht, dachig, locker anliegend, aus breit dreieckiger Basis pfriemlich zugespitzt, spitz, gekielt, violett angelaufen, c. 0.4 cm lang. Blüten in Zwischenräumen geöffnet, eintägig, c. 1.65—2 cm breit, die Sepalen und Petalen blassgelblich. Unpaares Sepalum aus nagelförmig zusammengezogener Basis eirund elliptisch, spitzlich, konkav, c. 1.1 cm lang, 0.4—0.46 cm breit. Paarige Sepalen schief rautenförmig, spitz, am Grunde zusammengezogen, konkav, c. 1.1 cm lang, 0.53—0.57 cm breit. Petalen schief schmal spatelig, stumpf oder stumpflich, c. 1 cm lang, 0.25—0.275 cm breit. Lippe 3lappig, gespornt, tutenförmig um die Säule gerollt, innen zwischen den Seitenlappen mit einem kegeligen, kahlen Callus, vorn mit langen, nicht keuligen Wimperhaaren, innen mit wenigen Haaren, weisslich, gegen den Rand aussen zimmtbraun gefleckt, von den Seitenlappen bis zur Spornspitze c. 1.15 cm

lang, 0.55 cm breit, ausgespreizt im ganzen 0.975 cm lang, 1.4 cm breit; Seitenlappen aufrecht, eingebogen, breit dreieckig, fast viereckig, mit abgerundetem Hinter- und absgestutztem Vorderrand; Mittellappen vorgestreckt, klein, breit dreieckig, stumpf, konkav, ausgespreizt c. 0.15 cm lang, 0.25 cm breit; Sporn abwärts gewandt, sackig, breit länglich, breit stumpf, eingedrückt, gelblich, bis zur Ovariumspitze c. 0.7 cm lang, innen auf der Vorderwand mit einer behaarten Längsrippe, innen an der Spitze braun gefleckt. Säule schief kegelig, weiss, c. 0.25—0.3 cm lang. Anthere kappig, rundlich fünfeckig, sehr stumpf, eingedrückt und mit einem sehr kleinen Zähnchen, zart, weiss. Pollinien 4, ungleich gross, die hinteren viel kleiner als die vorderen, vom Rücken zusammengedrückt, schief länglich eirund, stumpf, weisslich, mit dem kurzen, eirunden Stielchen und der kleinen, gebogenen Klebmasse c. 0.16 cm lang. Rostellum sehr kurz. Narbe quer. Säulenfuss mit dem Ovarium einen nahezu rechten Winkel bildend, gerade, 4kantig, konkav, c. 0.25 cm lang. Ovarium 6furchig, c. 1 cm lang.

*__Thrixspermum acutilobum__ J. J. S —? *Dendrocolla Histrix* BL. Bijdr. (1825), 291.—? *Aerides hystrix* LNDL. Gen. et sp. Orch. (1832), 242; MIQ. Fl. Ind. Bat. III (1855), 698.—? *Grossourdya hystrix* RCHB. F. Xen. Orch. II, 123.—? *Sarcochilus hystrix* RCHB. F. in WALP. Ann. VI (1861), 500.

Caulis tenuis, radicans, c. 15 cm. longus, internodiis c. 0.55—0.75 cm. longis, radicibus tenuibus, vaginam dorso supra inflorescentiam perforantibus. Folia patentia, loriformia, apice recurvula leviter contracta et oblique late rotundato-biloba, basi fere amplexicaulia, obtusangule canaliculata, costa media supra sulcata subtus obtuse prominente, coriacea, opaca, dilute viridia, inconspicue et minute sordide violaceo-punctata, c. 5.25 cm. longa, 1.3 cm. lata; vaginae tubulosae, internodia superantes, sectione transversa ellipticae, longitudinaliter prominule nervosae, colore folii, apice c. 0.4 cm. latae, basin versus sensim angustatae. Inflorescentiae vaginas 2 perforantes, patentes, elongatae, apice densissime multiflorae, diu flores gignentes, pedunculo filiformi, apice longius incrassato, opaco, pallide viridi, leviter sordide purpureo-suffuso, c. 11—16.75 cm. longo, apice c. 0.275 cm. diam., nonnullis vaginulis tubulosis donato, rachide brevi, crassa, c. 1.5 cm. longa, cum bracteis c. 0.8 cm. diam. Bracteae quaquaversae, erecto-patentes, e basi triangula rachidem fere amplectente longius trigono-subulato-acuminatae, acutissimae, pallide virides, c. 0.5 cm. longae. Flores intervallis brevibus singulatim aperti, teneri, ephemeri, dulce odorati, c. 1.7 cm. lati, sepalis petalisque flavescenti-albis. Sepalum dorsale superne recuvum, oblongo-ellipticum, basi apiceque leviter contractum, apice acutum brevissime incurvum (semper?), basi dorso leviter obtusangule incrassatum, c. 1 cm. longum, 0.38 cm. latum. Sepala lateralia oblique rhombeo-elliptica, inaequilatera, marginibus proximis basi recurva infra medium rotundato-dilatata, apicem versus sensim angustata, subacuta, costa media intus leviter canaliculata dorso incrassata, c. 1 cm. longa, 0.48 cm. lata. Petala oblique spathulato-lanceolata, subobtusa, medio concava, bene 0.9 cm. longa, 0.3 cm. lata. Labellum basi lata pedi gynostemii insertum, cum gynostemio et pede gynostemii curvato-tubulosum, saccatum, 3lobum, intus et margine antico longe capitellato-pilosum, callo quadrangulo apice rotundato-truncato et inconspicue obtuse apiculato apice et medio dilute castaneo intus medio in flexu, dilute sulphureum, superne parce et grosse cinnamomee maculatum, ab apice usque ad apicem ovarii c. 0.7 cm., usque ad apicem calcaris c. 0.9 cm., ab apice calcaris usque ad apicem ovarii c. 0.55 cm. metiens, explanatum c. 1 cm. latum, cum pilis c. 0.9 cm, absque pilis 0.85 cm. longum; lobi laterales erecti, late oblique trianguli, obtusissimi, margine postico rotundati; lobus intermedius porrectus, lobos laterales superans, sinibus latis humilibus a lobis lateralibus sejunctus, triangulus, apice conicus acutus, concavus, c. 0.13 cm. longus; calcar saccatum, incurvulum, longitudinaliter sulcatum, apice late subtruncatum, obtusangule retusum, angulato-bilobulum, apice intus macula cinnamomea ornatum, intus pariete postico excepto pilosum, usque ad apicem pedis gynostemii c. 0.44 cm. longum. Gynostemium breve, latum, apicem versus angustatum, dorso convexum, album, c. 0.275 cm. longum, 0.23 cm. latum, apice late et breviter triangulo-productum et plus minusve erosulum et bidentatum, clinandrio leviter concavo. Anthera cucullata, basi altius biloba, apice lata rotundata, brevissime apiculato-acuminata, alba, c. 0.1 cm. lata, connectivo inter thecas incrassato et verruculoso. Pollinia 4, inaquimagna, oblique oblongo-ovalia, apice rotundata, sectione transversa rotundato-triangula, posteriora bene minora, pallide flavescentia, cum stipite triangulo apice libero semipellucido et glandula transversa curvata fere 0.1 cm. longa. Rostellum breviter 2dentatum, dentibus remotis. Stigma transverse triangulum. Pes gynostemii cum ovario angulum rectum faciens, transverse quadrangulus, albus, c. 0.2 cm. latus, c. 0.11 cm. longus. Ovarium tenue, 6sulcatum, pallide viride, c. 0.8 cm. longum.

Java: Pasoeroean, Malang. (Fräulein M. VON HERTLING, leb. Pfl., kult. in Hort. J. J. SMITH). Ebenda, zwischen Ampelgading und der Kali Glidik in 700—800 m ü. d. M. in Kaffeeplantagen. (C. A. BACKER n. 3555, bl. im Mai 1912). Loemadjang, bei Pasirian, auf Bäumen. (H. ZOLLINGER n. 2669, im Februar 1845).

Besoeki, Banjoewangi, Poerwodjojo bei Kempit. (J. A. CEPHAS, leb. Pfl., kult. in Hort. J. J. SMITH).

Die Beschreibung wurde nur angefertigt nach einigen wenigen von Herrn J. A. CEPHAS erhaltenen, lebenden Exemplaren, die jedoch sehr gut übereinstimmen mit einer mir freundlichst von Fräulein M. VON HERTLING abgegebenen, bei Malang gesammelten Pfanze. Von den anderen oben erwähnten Exemplaren sind keine guten Blüten vorhanden; habituell stimmen sie jedoch sehr gut mit der hier beschriebenen Art überein, so dass ich ihre Zugehörigkeit nur wenig anzweifle.

Alle diese Pflanzen sehen habituell auch einem mir in liebenswürdiger Weise leihweise aus Leiden zugeschickten BLUMEschen Original von *Dendrocolla histrix* (H. L. B. n. 903, 16—2675) sehr ähnlich.

Die Art sieht *Th. patens* J. J. S. ziemlich ähnlich, hat jedoch viel längere Blütenstände.

Was die in „Orchideen von Java" unter *Thrixspermum Hystrix* aufgeführten Synonyme anbelangt, möchte ich noch hervorheben, dass *Th. indusiatum* RCHB. F. sicher nicht identisch ist mit *Dendrocolla histrix* LL. Die Seiten der Xenia Orch. II. wo *Grossourdya hystrix* RCHB. F. besprochen wird, fehlen leider in Buitenzorg; in Bot. Zeit. XXII wird nur die Gattung *Grossourdya* erwähnt, aber keine Arten dahin übergeführt.

Thrixspermum acutilobum J. J. S.

Stengel dünn, c. 15 cm lang, die Internodien 0,55—0.75 cm lang. Blätter abstehend, riemenförmig, an der Spitze ungleich und breit abgerundet 2lappig, rinnig, mit unten stumpf vorspringender Mittelrippe, ledrig, hellgrün, schwach violett punktiert, c. 5.25 cm lang, 1.3 cm breit; Scheiden röhrig, länger als die Internodien, schwach längsrippig. Blütenstände 2 Scheiden durchbohrend, abstehend, verlängert, an der Spitze sehr dicht und vielblütig, lange fortblühend; Pedunculus fadenförmig, an der Spitze verdickt, c. 11—16.75 cm lang; Rachis verdickt, kurz, c. 1.5 cm lang, mit den Brakteen 0.8 cm breit. Brakteen allseitswendig, aufrecht abstehend, aus dreieckiger Basis pfriemlich, sehr spitz, 0.5 cm lang. Blüten in Zwischenräumen blühend, zart, eintägig, süss riechend, c.1.7 cm breit, die Sepalen und Petalen gelblichweiss. Unpaares Sepalum länglich elliptisch, an der Basis und Spitze etwas zusammengezogen, spitz, c. 1 cm lang, 0.38 cm breit. Paarige Sepalen schief rautenförmig elliptisch, die einander zugewandten Ränder am Grunde zurückgebogen und unterhalb der Mitte abgerundet verbreitert, nahezu spitz, c. 1 cm lang, 0.48 cm breit. Petalen schief spatelig lanzettlich, stumpflich, c. 0.9 cm lang, 0.3 cm breit. Lippe mit der Säule und Säulenfuss röhrig und gekrümmt, am Grunde sackig, 3lappig, innen und am vorderen Rande lang köpfig behaart, innen in der Mitte mit einem vierkantigen, vorn abgerundet abgestutzten, vorn und in der Mitte hellzimmtbraunen Callus, hellschwefelgelb, nach oben mit wenigen zimmtbraunen Flecken, im ganzen c, 0.9 cm, bis zur Ovariumspitze 0.7 cm lang, ausgespreizt 1 cm breit, ohne die Haare 0.85 cm lang; Seitenlappen aufrecht, breit dreieckig, sehr stumpf, am hinteren Rande abgrundet; Mittellappen vorgestreckt, die Seitenlappen überragend und von diesen nur durch sehr seichte Buchten getrennt, dreieckig, an der Spitze kegelig, spitz, konkav, c. 0.13 cm lang; Sporn sackig, schwach vorwärts gebogen, mit einer Längsfurche, stumpfwinkelig eingedrückt, innen mit einem braunen Fleckchen, c. 0.44 cm, bis zum Ovarium 0.55 cm lang. Säule kurz, breit, gegen die Spitze verschmälert, weiss, 0.275 cm lang, 0,23 cm breit, mit vorgestreckter, kurz dreieckiger, ausgefressener oder 2zähniger Spitze. Anthere kappig, sehr kurz zugespitzt, an der Basis 2lappig, 0.1 cm breit. Pollinien 4, ungleich, länglich oval, auf dem Querschnitt dreikantig, blassgelblich, mit dem dreieckigen, an der Spitze freien Stielchen und der halbmondförmigen Klebmasse fast 0.1 cm lang. Narbe querdreieckig. Säulenfuss mit dem Ovarium einen rechten Winkel bildend, quer viereckig, weiss. Ovarium dünn, blassgrün, c. 0.8 cm lang.

***Thrixspermum javanicum** J. J. S. n. sp.

Caulis compressus, c. 7.5—11 cm. longus, internodiis c. 0.35—0.6 cm. longis, radicibus solitariis, vaginam dorso supra inflorescentiam oblique perforantibus. Folia patentia, apice incurva, oblonga ad loriformi-oblonga, apice lato subaequaliter vel oblique rotundato-biloba cum apiculo minimo interposito, basi conduplicata. convexa cum sulco longitudinali, costa media dorso obtuse prominente basin versus carinata et in vaginam decurrente, carnosa, opaca, dilutius viridia, c. 3.6—5.3 cm. longa, 1.35—1.5 cm. lata; vaginae tubulosae, lateraliter compressae, prominule nervosae, opacae, dilute virides, internodium aequantes, apice c. 0.35 cm. latae. Inflorescentiae vaginam dorso ad basin perforantes, patentes vel patentissimae, folio breviores, apice densiflorae, verisimiliter pauciflorae, pendunculo tenui, apice incrassato, dilute viridi, c. 1.5—1.7 cm. longo, vaginulis c. 3 brevibus tubulosis donato, rachide crassiuscula, brevissima. Bracteae erecto-patentes, plus minusve incurvulae, e basi late triangula concava subulatae, carnosulae, dilute virides, c. 0.35 cm longae. Flores mediocres, quaquaversi, teneri, ephemeri, odorem *Lonicerae* exhalantes, pallide flavescentes, bene aperti, c. 1.95 cm. lati, 1.5 cm longi. Sepalum dorsale erectum, oblongo-ellipticum, basi leviter contractum, apice obtusum, leviter concavum, c. 0.975 cm. longum, 0.4 cm. latum. Sepala lateralia divaricata, oblique subfalcato-elliptico-ovata, apicem versus angustata, subacuta, leviter concava, margine antico basi recurvula, dorso carinata, c. 1 cm. longa, 0.47 cm. lata. Petala oblique spathulata, obtusiuscula, vix concava, c. 0.83—0.9 cm longa, basi 0.17 cm., superne 0.3 cm lata. Labellum 3lobum, calcaratum, callo inclinato lato transverse quadrangulo late retuso glabro postice clavato-piloso flavescenti antice macula aurea ornato c. 0.17 cm. lato inter lobos, flavescens, lobis extus cinnamomee intus pallidius maculatum, c. 0.9 cm. longum, ad lobos laterales cum pilis 0.65 cm latum, explanatum 0.9 cm. longum, 1 cm latum; lobi laterales erecti, margine antico recurvuli, late oblique rotundato-trianguli, subquadranguli, margine postico rotundati, leviter convexi, margine antico longe et dense intus extusque laxius clavato-pilosum; lobus intermedius oblique erectus, cum calcaris pariete antico angulum obtusum formans, late semielliptico-triangulus, obtusus, leviter concavus, extus infra apicem obtusangule incrassatus, utrinque dense clavato-pilosus, usque ad basin calcaris c. 0.375 cm, usque ad basin loborum lateralium bene 0.2 cm. longus, 0.35 cm. latus; calcar saccatum, pariete postico pedem gynostemii continuum, pariete antico cum lobo intermedio angulum obtusum faciens, lateraliter visum oblique conicum, antice visum oblongum, obtusum, retusum, antice longitudinaliter canaliculatum, intus pariete antico costa longitudinali in apice incrassata flava densius et utrinque laxius clavato-pilosum, pariete postico apicem versus breviter pilosum, ceterum glabrum, usque ad apicem calcaris c. 0.35 cm., usque ad basin lobi intermedii 0.5 cm. longum. Gynostemium breviusculum, leviter a latere compressum, basi subtus incrassatum sed non a pede distinctum, infra apicem leviter constrictum, subtus concavum, albidum, absque anthera c. 0.23 cm. longum, clinandrio concavo, apice producto, margine erosulo, auriculis dentiformibus, incurvis. Anthera cucullata, transversa, aequilatera-

liter trapeziformis, apice dilatata, retusa cum denticulo triangulo in sinu, connectivo leviter costato-incrassato, alba, c. 0.16 cm, lata. Pollinia 4, a dorso compressa, inaequalia, brevia, oblique triangula, praesertim majora obtusa, antica quam postica bene majora, albida, cum stipite brevi late ovato-triangulo apice libero obtuso convexo albo et glandula brevi transversa semilunato-curvata alba c. 0.1 cm. longa. Rostellum breve, late excisum, 2dentatum, cum denticulo interposito. Stigma orbiculari-sexangulatum. Pes gynostemii cum ovario angulum subrectum faciens, c. 0.15 cm. longus. Ovarium pedicellatum tenue, 6sulcatum, virescenti-album, c. 0.8 cm. longum.

Java: Priangan, Tjipateungteung bei Tjibeber, in 800 m ü. d. M. (W .F. WINCKEL, bl im Juli 1917, kult. unter n. 360).

Diese Art und *Th. acutilobum*. J. J. S. sind mit *Th. conigerum* J. J. S. die einzigen javanischen Arten, bei welchen die Seiten- und Mittellappen der Lippe gleich lang behaart sind; bei *Th. conigerum* J. J. S. sind die Haare jedoch spitz und nicht keulig. Die Blütenstände sind sehr kurz, wie es auch bei *Th. trichoglottis* O. K. der Fall ist. Bei den anderen Arten kommt es zwar häufig vor, dass die schwachen Blütenstände kürzer bis wenig länger sind als die Blätter, bei gut ausgebildeten Exemplaren überragen sie die Blätter jedoch bedeutend, nur bei *Th. malayanum* J. J. S. werden sie nur wenig länger als die Blätter.

Thrixspermum javanicum J. J. S.

Stengel zusammengedrückt, c. 7.5—11 cm lang, die Internodien c. 0.35—0.6 cm lang, mit alleinstehenden, die Scheide hinten über der Inflorescenz durchbrechenden Wurzeln. Blätter abstehend, an der Spitze eingebogen, länglich riemenförmig. an der breiten Spitze mehr oder weniger ungleich abgerundet 2lappig, oben konvex mit einer Längsfurche, mit unten stumpf vorragender, gegen die Basis gekielter Mittelrippe, matt hellgrün, fleischig, c. 3.6—5.3 cm lang, 1.35 - 1.5 cm breit; Scheiden von der Seite zusammengedrückt, hellgrün, den Internodien gleich lang, an der Spitze bis c. 0.3 cm breit. Blütenstände abstehend oder weit abstehend, wahrscheinlich wenigblütig, kürzer als die Blätter; Pendunculus dünn, an der Spitze verdickt, hellgrün, c. 1.5—1.7 cm lang; Rachis sehr kurz, ziemlich dick. Brakteen aufrecht abstehend, mehr oder weniger eingebogen, aus breit dreieckiger Basis pfriemlich, hellgrün, c. 0.35 cm lang Blüten allseitswendig, zart, eintägig, wohlriechend wie Geissblatt, blassgelblich. c. 1.95 cm breit. Unpaares Sepalum länglich elliptisch, stumpf, am Grunde etwas zusammengezogen, c. 0.975 cm breit. Paarige Sepalen schief elliptisch eirund, schwach sichelig, ziemlich spitz, gekielt, c. 1 cm lang, 0.47 cm breit. Petalen schief spatelig, stumpflich, c. 0.83—0.9 cm. lang, an der Basis 0.17 cm, nach oben 0.3 cm breit. Lippe 3lappig, gespornt, zwischen den Seitenlappen mit einem breiten, viereckigen, breit eingedrückten, mit einem gelben Fleck gezeichneten Quercallus, gelblich, im oberen Teil zimmtbraun gefleckt, ausgespreizt c. 0.9 cm lang, 1 cm breit; Seitenlappen aufrecht, breit abgerundet dreieckig, fast viereckig, beiderseits und am Rande lang keulig abstehend behaart; Mittellappen mit dem Sporn einen stumpfen Winkel bildend, breit halbelliptisch dreieckig, stumpf, etwas konkav, unten an der Spitze stumpfwinkelig verdickt, beiderseits keulig behaart, bis zur Basis der Seitenlappen 0.2 cm lang, 0.35 cm breit; Sporn sackig, am Rücken gerade, von der Seite gesehen kegelig, von vorne gesehen länglich, stumpf, eingedrückt, innen mit einer gelben Längsrippe und keulig behaart, innen am Grunde kahl, bis zur Säulenfussspitze c. 0.35 cm lang. Säule ziemlich kurz, schwach von der Seite zusammengedrückt, allmählich in den Säulenfuss übergehend, ohne Anthere 0.23 cm lang; Clinandrium konkav, an der Spitze vorgezogen, am Rande klein ausgefressen; Öhrchen zahnförmig. Anthere quer trapezenförmig, an der breiten Spitze eingedrückt und mit einem Zähnchen, weiss, c. 0.16 cm breit. Pollinien 4, vom Rücken zusammengedrückt, ungleich gross, schief dreieckig, stumpf, weisslich, mit dem kurzen, breit eirund dreieckigen Stielchen und der halbmondförmigen Klebmasse c. 0.1 cm lang. Narbe rundlich sechseckig. Säulenfuss mit dem Ovarium einen rechten Winkel bildend, c. 0.15 cm lang. Ovarium mit dem Stielchen c. 0.8 cm lang.

***Thrixspermum malayanum** J. J. S. n. sp.

Caulis teres, ad c. 15 cm. longus, 0.17 cm. diam., internodiis c. 0.35—0.55 cm. longis, radicem 1 patentissimam emittentibus. Folia patentia, superne recurva, loriformia, apice inaequaliter acute bidentata, obtusangule canaliculata cum sulco longitudinali, subtus convexa, carnosa, rigida, utrinque nitidule atroviridia, c. 3—5 cm. longa, 0.7—1.1 cm. lata; vaginae tubulosae, sectione transversa ellipticae, longitudinaliter costulatae, internodia aequantes, c. 0.2 - 0.26 cm. latae. Inflorescentiae vaginam dorso ad basin infra radicem perforantes, patentes vel patentissimae, apice dense pluriflorae, pedunculo tenui, tereti, apice incrassato, viridi, plus minusve purpureomaculato, c. 4—6.5 cm. longo, vaginulis c. 2 tubulosis donato, rachide brevissima, crassiuscula. Bracteae quaquaversae, patentes, triangulae, acutae, concavae, crassiusculae, dilute virides, c. 0.2 cm. longae. Flores intervallis aperti, ephemeri, teneri, flavescentes, odorem fructuum Vanillae exhalantes, c. 1.4 cm. lati, sepalis petalisque patentissimis. Sepalum dorsale spathulatum, concavum, c. 0.73 cm. longum, ungue brevi, quadrato, c. 0.2 cm. longo et lato, lamina angulato-ovali, obtusa, c. 0.42 cm. lata. Sepala lateralia e basi breviter unguiculato-contracta oblique angulato-subelliptica, crasse apiculata, concava, margine antico inferne recurvula, costa media dorso incrassata, c. 0.75 cm. longa, basi 0.22 cm., lamina 0.475 cm. lata. Petala oblique spathulata, obtusa, concava, costa media praesertim basin versus incrassata, c. 0.65 cm. longa, ungue quadrangulo, c. 0.17 cm. lato, lamina oblique subobovato-ovali, c. 0.32 cm. lata. Labellum basi lata apici pedis gynostemii insertum, saccatum, 3lobum, intus margine postico loborum lateralium excepto dense clavato-pilosum et pariete antico medio callo transverso aequilateraliter trapeziformi plus minusve retuso dense piloso apice macula cinnamomea ornato postice in costam convexam decurrentem producto instructum, flavescenti-album, serie transversa semiannulari macu-

larum cinnamomearum extus ad basin lobi intermedii, ab apice lobi intermedii usque ad apicem ovarii bene 0.4 cm. longum, ab apice loborum lateralium usque ad apicem sacci c. 0.725 cm. metiens, 0.475 cm. latum, explanatum late cuneatum, usque ad apicem lobi intermedii c. 0.625 cm., usque ad apicem loborum lateralium 0.8 cm. longum, 0 9 cm. latum; lobi laterales erecti, incurvuli, oblique trianguli, margini postico leviter rotundati, apice rotundato-obtusi, margine antico clavato-ciliati, lobum intermedium superantes, margine antico c. 0.23 cm. longi; lobus intermedius brevis, porrectus, cum sacco angulum obtusum faciens, late obtusangule triangulus, obtusissimus, concavus, extus inferne rotundato-incrassatus, quam lobos laterales brevius pilosus, extus papillosus, interdum macula cinnamomea ad apicem, c. 0.12 cm. longus, fere 0.4 cm. latus, explanatus late rotundatus; sacus cum pede gynostemii angulum obtusum faciens, apice late truncatus, retusus, apice cinnamomeus, cum pede gynostemii c. 0.45 cm. longus, 0.35 cm. latus. Gynostemium breve, dorso convexum, flavescenti-album, absque anthera c. 0.17 cm. longum. Anthera cucullata, transversa, subsexangularis, apice leviter retusa, tenera, alba, c. 0.14 cm. lata. Pollinia 4, inaequimagna, a dorso compressa, flavescentia, 2 antica suborbicularia, basi interiore angulata, extus convexa, c. 0.05 cm. longa, 2 interiora bene minora, tenuiora. Rostellum breve, excisum. Stigma alte excavatum. Pes gynostemii cum ovario angulum acutum faciens, quadratus, c. 0.175 cm. longus. Ovarium 6sulcatum, dilute viride, c. 0.7 cm. longum. Fructus elongatus, trigonus, subsexangulatus, 6costatus, costis sulcis separatis, apice subrostrato-contractus, basi in pedicellum 6sulcatum c. 0.2—0.3 cm. longum attenuatus, dilute flavo-viridis, interdum leviter purpurascenti-suffusus, c. 2.3—4.2 cm. longus, 0.3—0.33 cm. diam.

Java: Banten, Lebak, Rangkas Bitoeng, in 50 m ü. d. M., viele Exemplare in einem *Citrus* baume. (C. A. BACKER, ohne Nummer, bl. und fr. im Juli 1911).

Batavia, Buitenzorg, Depok, in 125 m. ü. d. M., auf Sträuchern in einem Garten. (D. VAN MULLEM, 1918, leb. Pfl., kult. in Hort. J. J. SMITH; R. C. BAKHUIZEN VAN DEN BRINK, 1920, leb. Pfl., kult. in Hort. J. J. SMITH). Buitenzorg bei Tjimoelang in c. 200 m ü. d. M. (Sundanesischer Pflanzensucher KARTAMAH, 1920, leb. Pfl., kult. in Hort. J. J. SMITH). Am See von Tjigombong in 250 m ü. d .M. (W. M. DOCTERS VAN LEEUWEN, 1918, leb. Pfl., kult. in Hort. J. J. SMITH).

Molukken: Insel Batjan, auf Sträuchern im Dorfe. (J. J. SMITH, 1900, leb. Pfl., kult. in Hort. Bog. unter n. 268m).

Die Art ist vor den anderen javanischen Spezies ausgezeichnet durch die sehr kurzen, nur 0.2 cm langen Brakteen, die nur mit einer Querreihe weniger braunen Flecken gezeichnete Lippe mit einem sehr kurzen, kaum vorspringenden Mittellappen und längeren, verhältnismässig schmalen Seitenlappen und sehr kurzen Pollinien.

Die Blütenstände der bei Depok, Buitenzorg und Tjigombong gesammelten Exemplare überragen die Blätter verhältnismässig nur wenig, bei den

von Rangkas Bitoeng stammenden Exemplaren werden sie bis 10 cm, und bei denjenigen von Batjan sogar bis 16 cm lang. In den Blütenmerkmalen stimmen sie jedoch gut überein. Von Rangkas Bitoeng habe ich keine lebenden Exemplare gesehen; bei den übrigen stimmt auch die Blütenfärbung überein.

Das Auftreten der Art in den Molukken ist interessant.

Beschreibung nur nach von Depok stammenden Exemplaren.

Thrixspermum malayanum J. J. S.

Stengel stielrund, bis c. 15 cm lang, 0.17 cm dick, die Internodien 0.35—0.55 cm lang, mit einer weit abstehenden Wurzel an jedem Gliede. Blätter abstehend, gegen die Spitze zurückgebogen, riemenförmig, ungleich und spitz 2zähnig, rinnig, unten konvex, fleischig, steif, etwas glänzend dunkelgrün, c. 3—5 cm lang, 0.7—1.1 cm breit; Scheiden röhrig, auf dem Querschnitt elliptisch, längsrippig. Blütenstände abstehend, an der Spitze dicht mehrblütig; Pedunculus dünn, grün, mehr oder weniger purpurn gefleckt, c. 4—6.5 cm lang, mit 2 Schaftblättern; Rachis sehr kurz. Brakteen allseitswendig, abstehend, dreieckig, spitz, konkav, am Rücken konvex, ziemlich dick, hellgrün, c. 0.2 cm lang. Blüten in Zwischenräumen blühend, zart, gelblich, mit Vanillegeruch, c. 1.4 cm breit. Sepalen aus kurzgenageltem Grunde ungefähr oval, stumpf, konkav, c. 0.75 cm lang, 0.42 cm breit, die paarigen schief, mit einem Spitzchen und etwas breiter. Petalen schief spatelig, stumpf, konkav, 0.65 lang, 0.32 cm breit. Lippe sackig, 3lappig, ausser den Hinterrändern der Seitenlappen innen dicht keulig behaart, in der Mitte mit einem querviereckigen, eingedrückten, dicht behaarten, an der Spitze mit einem orangebraunen Fleckchen gezeichneten, nach hinten in eine Längsrippe ausgehenden Callus, gelblichweiss, aussen am Grunde des Mittellappens mit einer Querreihe weniger zimmtbraunen Flecken, vom Mittellappen bis zum Fruchtknoten c. 0.4 cm, vertikal 0.725 cm messend, ausgespreizt breit keilig, 0.8 cm lang, 0.9 cm breit; Seitenlappen aufrecht, etwas eingebogen, schief dreieckig, abgerundet, 0.23 cm lang; Mittellappen kurz, vorgestreckt, mit dem Sack einen stumpfen Winkel darstellend, breit dreieckig, sehr stumpf, konkav, aussen verdickt, c. 0.12 cm lang, 0.4 cm breit, ausgespreizt breit abgerundet; Sack mit dem Säulenfuss einen stumpfen Winkel bildend, breit abgestutzt, eingedrückt, an der Spitze zimmtbraun, bis zum Fruchtknoten 0.45 cm lang, 0.35 cm breit. Säule kurz. Anthere quer, eckig, an der Spitze etwas eingedrückt, weiss, zart, 0.14 cm breit. Pollinien 4, ungleich, vom Rücken zusammengedrückt, gelblich, rundlich. Rostellum kurz. Narbe tief ausgehöhlt. Säulenfuss mit dem Ovarium einen spitzen Winkel bildend, vierkant, 0.175 cm lang. Ovarium hellgrün, 0.7 cm lang. Frucht verlängert, 3-, mehr oder weniger 6kantig, 6rippig, an der Spitze schnabelig zusammengezogen, kurz gestielt, hellgelblichgrün, 2.3—4.2 cm im Durchmesser.

* **Thrixspermum squarrosum** J. J. S. n. sp.

Caulis elongatus, plus minusve ramosus, serpentinus, tenuis, rigidus, ad c. 27 cm. longus, internodiis c. 1.1—1.4 cm. longis, radicibus solitariis, vaginam dorso supra medium et supra inflorescentiam perforantibus, elon-

gatis, patentissimis. Folia subpatentissima, lanceolata, apice lata, oblique bidentata, basi paulum angustata, costa media supra sulcata, carnosa, opaca, viridia, sordide violaceo-maculata, c. 4.2—4.8 cm. longa, 1.15—1.3 cm. lata; vaginae tubulosae, internodia aequantes, sectione transversa ellipticae, prominenter nervosae, c. 0.3—0.33 cm. latae. Inflorescentiae e medio vel infra medium internodiorum ortae, patentes vel patentissimae, adscendentes, apice dense multiflorae, folia multo superantes, diu florentes, pedunculo tenui, tereti, apice incrassato, rigido, dilute flavo-viridi, sordide punctato, c. 9—20 cm. longo, vaginulis c. 3 brevibus basi tubulosis apice lateraliter compressis donato, rachide incrassata, valde brevinodi, ad c. 4 cm. longa, cum bracteis c. 1.1—1.15 cm. diam. Bracteae valde approximatae, quaquaversae, patentissimae ad reversae, e basi lata triangula concava subulatae, acutissimae, dorso convexae, crassae, rigidae, basi purpureo-suffusae, c. 0.55—0.75 cm. longae. Flores intervallis aperti, ephemeri, flavescentes. Sepalum dorsale oblongum, apice margine incurvulum, obtusum, basi spathulato-contractum, concavum, c. 0.95 cm. longum, 0.35 cm. latum. Sepala lateralia oblique oblongo-rhombea, breviter acuminata, acuta, basi leviter unguiculato-contracta, leviter concava, 5nervia, costa media dorso incrassata, c. 0.95 cm. longa, 0.42 cm. lata. Petala oblique spathulata, leviter concava, 3nervia, c. 0.87 cm. longa, ungue circa $^2/_5$ partes totius longitudinis occupante, fere 0.15 cm. lato, lamina oblonga, obtusa, bene 0.25 cm. lata. Labellum saccatum, 3lobum, medio recurvum, callo oblique porrecto transverso quadrangulo a dorso compresso leviter rotundato glabro antice macula flava cinnamomee punctata ornato postice in costulam convexam decurrente intus in flexu, fascia lata pilis clavatis patentissimis albidis apice atrofuscis vestita a basi calli usque ad apicem sacci, flavescenti-album, apice sacci dilute flavi excepto maculis flavis cinnamomee annulato-punctatis inspersum, intus apice loborum lateralium excepto fusco-purpureo-punctatum, ab apice usque ad apicem ovarii c. 0.76 cm., ab apice loborum lateralium usque ad apicem sacci 0.75 cm., ab apice ovarii usque ad apicem sacci 0.24 cm. metiens, explanatum c. 0.775 cm. longum, fere 1 cm. latum; lobi laterales erecti, gynostemium bene superantes et includentes, oblique et late trianguli, margine postico rotundati, obtusi, leviter concavi, extus convexi, intus apicem versus et margine densius basin versus parce clavato-pilosi; lobus intermedius porrectus, laterales superans, cum lateralibus angulos obtusos faciens, supra visus triangulus, obtusus, subcymbiformi-concavus, subtus ad apicem fere rectangule incrassatus, intus et margine dense et breviter velutino-pubescens, explanatus c. 0.25 cm. longus, bene 0.4 cm. latus; calcar saccatum, pariete postico cum pede gynostemii angulum obtusum faciens, late conicum, obtusum, vix retusum, dorso convexum, intus castaneo-notatum. Gynostemium breve, oblique conicum, vix a latere compressum, dorso convexum, subtus marginibus elevatis in pedem gynostemii decurrentibus concavum, albidum, c. 0.25 cm. longum, clinandrio obliquo, apice obtuso. Anthera cucullata, quadrangulo-orbicularis, apice minute apiculata, albida, c. 0.12 cm. lata. Pollinia 4, inaequalia, a dorso compressa, 2 antica maxima, crassa, subquadrangulo-ovalia, antice convexa, 2 postica minora

et multo tenuiora, oblique oblongo-ovata, cum stipite brevissimo lato apice libero et rotundato et glandula parva curvata fere 0.1 cm. longa. Stigma transversum, depresse subquinquangulato-ovatum. Rostellum breve, bipartitum, dentibus acutis. Pes gynostemii cum ovario angulum obtusum subrectum faciens, quadratus, apice rectangule excisus, concavus, albidus, purpureo-punctatus, c. 0.2 cm. longus, Ovarium 6sulcatum, pallide viride, c. 0.5 cm. longum.

Java: Priangan, Limbangan, Kawah Kamodjan in c. 1500 m ü.d.M, im Urwalde. (W. M. DOCTERS VAN LEEUWEN n. 2434, bl. im September 1916). Ebenda, bei Pateungteung in 1400—1500 m ü. d.M., im Urwalde. (W. M. DOCTERS VAN LEEUWEN n. 2614 und n. 3036, bl. im Mai 1917 und November 1918). Auf dem Goenoeng Djaja, Südostgipfel, in 1500 m ü.d.M. im Urwalde auf Kalkfelsen, epiphytisch. (H. J. LAM n. 144, im März. 1920). Auf dem Papandajan am Südhang, in c. 1500—1700 m ü. d. M. (L. B. VAN DER HEGGE ZIJNEN, kult. unter n. 44). Bandoeng, Indragiri auf Goenoeng Patoeha, in c. 1500 m ü. d. M., im Walde; viel. (R. C. BAKHUIZEN VAN DEN BRINK n. 162, bl. im Juli 1905). Tjibeureum bei Tjinjiroean, in c. 1500 m ü. d. M., im Walde. (J. J. SMITH n. 434, bl. im April 1911). Taloen, in c. 1700 m ü. d. M. (C. A. BACKER n. 5701, bl. im November 1912).

Eine durch die langen Blütenstände und weit abstehenden bis zurückgerichteten Brakteen äusserlich sehr leicht zu kennenden Art. Im Buitenzorger Herbarium finden sich noch einige Exemplare mit ziemlich weit abstehenden Brakteen. Das Material ist nicht genügend um zu entscheiden ob sie vielleicht einer anderen Art angehören.

Th. squarrosum hat mit *Th. patens* J. J. S. das stark gefleckte Labellum gemein.

Die Art blüht in Buitenzorg sehr selten; nur einmal ist er mir gelungen bei frisch angeführten Pflanzen eine Blüte zur Entfaltung zu bringen.

Thrixspermum squarrosum J. J. S.

Stengel verlängert, mehr oder weniger verzweigt, geschlängelt, dünn, steif, bis c. 27 cm lang, die Internodien 1.1—1.4 cm lang. Wurzeln alleinstehend, die Scheiden am Rücken in der Mitte oberhalb der Inflorescenz durchbohrend. Blätter ziemlich weit abstehend, lanzettlich, ungleich 2zähnig, fleischig, matt grün, viollett gefleckt, c. 4.2—4.8 cm lang, 1.15—1.3 cm breit; Scheiden röhrig, den Internodien gleich lang, auf dem Querschnitt elliptisch, vorragend nervig, 0.3—0.33 cm breit. Blütenstände in oder unterhalb der Mitte der Internodien, aufstrebend, an der Spitze dicht vielblütig; Pedunculus dünn, an der Spitze verdickt, 9—20 cm lang, mit c. 3 kurzen Schaftblättern; Rachis verdickt, bis c. 4 cm lang, mit den Brakteen 1.1—1.15 cm im Durchmesser. Brakteen dicht zusammengedrängt, allseitswendig, weit abstehend bis zurückgerichtet, aus breit dreieckiger konkaver Basis pfriemlich, sehr spitz, steif, c. 0.55—0.75 cm lang. Blüten in Zwischenräumen blühend, eintägig, gelblich. Unpaares Sepalum länglich, stumpf, an der Basis spatelig zusammengezogen, konkav, c. 0.95 cm lang, 0.35 cm breit. Paarige Sepalen schief länglich rautenförmig, kurz zugespitzt, an der Basis schwach zusammengezogen, mit aussen verdickter Mittelrippe, c. 0.95 cm lang, 0.42 cm breit. Petalen spatelig, c. 0.87 cm lang, der Nagel ungefähr $^2/_5$ der ganzen Länge, 0.15 cm breit, die Platte länglich, stumpf, 0 25 cm breit. Lippe sackig, 3lappig, in der Mitte vorwärts gebogen, innen mit einem viereckigen, vorgestreckten, vom Rücken zusammengedrückten, schwach abgerundeten, vorn mit einem gelben, braun punktierten Fleckchen gezeichneten, nach hinten in ein konvexes Rippchen herablaufenden Quercallus und mit einem breiten, mit keuligen Haaren bekleideten Längsbande vom Callus bis zur Spornspitze, gelblichweiss, ausser der Spornspitze mit gelben, ringförmig zimmtbraun punktierten Flecken, c. 0.76 cm lang, von der Spitze des Fruchtknotens bis zur Spornspitze 0.24 cm messend, ausgespreizt 0.775 cm lang, fast 1 cm breit; Seitenlappen aufrecht, die Säule gut überragend, schief und breit 3eckig, stumpf, am Hinterrande abgerundet, innen gegen die Spitze und am Rande ziemlich dicht, gegen die Basis spärlich keulig behaart; Mittellappen vorgestreckt, die Seitenlappen überragend und mit diesen stumpfe Winkel darstellend, von oben gesehen dreieckig, stumpf, fast kahnförmig konkav, innen und am Rande dicht und kurz sammtig behaart, ausgespreizt 0.25 cm lang, gut 0.4 cm breit; Sack mit dem Säulenfuss einen stumpfen Winkel bildend, breit kegelig, stumpf, kaum eingedrückt, am Rücken konvex, innen braun gezeichnet. Säule schief kegelig, kaum von der Seite zusammengedrückt, unten konkav, weisslich, 0.25 cm lang. Anthere kappig, viereckig rund, an der Spitze mit einem kleinen Spitzchen, 0.12 cm breit. Pollinien 4, ungleich, vom Rücken zusammengedrückt, die 2 vorderen dick, schwach 4eckig oval, vorn konvex, die 2 hinteren kleiner und viel dünner, schief länglich eirund, mit dem kurzen, breiten, an der Spitze freien und abgerundeten Stielchen und der kleinen Klebmasse fast 0.1 cm lang. Narbe quer. Rostellum kurz, 2teilig, mit spitzen Zähnen. Säulenfuss met dem Ovarium einen stumpfen, fast rechten Winkel darstellend, vierkant, konkav, weisslich, purpurn punktiert, 0.2 cm lang. Ovarium blassgrün, 0.5 cm lang.

* **Thrixspermum patens** J. J. S. n. sp.

Planta parva. Caulis tenuis, sectione transversa ellipticus, dilute viridis, c. 7.5–15 cm. longus, 0.17 cm. latus, internodiis c. 0.5—0.7 cm. longis, basin versus paulo attenuatis, radicem 1 tenuem emittentibus. Folia patentia vel subpatentissima, recurvula, loriformia, apice plus minusve inaequaliter obtuse vel acute 2lobulata, lobis irregulariter marginatis, apice tantum leviter carinata, carina in apiculum dentibus multo breviorem exeunte, plerumque leviter obtusangule canaliculata cum lateribus convexis, costa media supra sulcata subtus obtuse prominente, carnosula, opace viridia, plerumque plus minusve sordide violaceo-maculata, c. 3.2—5 cm. longa, 0.6—0.8 cm. lata; vaginae tubulosae, sectione transversa ellipticae, leviter longitudinaliter costulatae, opacae, dilute virides, internodia subaequantes, c. 0 2—0.24 cm. latae. Inflorescentiae solitariae, vaginam dorso supra basin

infra radicem perforantes, patentes, apice dense multiflorae, pedunculo filiformi, apice sensim incrassato, dilute viridi, valde sordide violaceo-suffuso et punctato, c. 3—13 cm. longo, rachide incrassata, ad c. 2.5 cm. longa, cum bracteis c. 0.6—0.8 cm. diam. Bracteae quaquaversae, patentes, e basi dilatata rachidem semiamplectente concava subulatae, acutae, dorso crasse carinatae, pallide vel dilute virides, plus minusve sordide purpureo-suffusae et punctatae, c. 0.35—0.5 cm. longae. Flores intervallis aperti, ephemeri, teneri, leviter odorati, pallide flavescentes, c. 1.4 cm. diam., sepalis patentissimis, petalis plus minusve reflexis, omnibus concavis. Sepalum dorsale oblongo-ellipticum, obtusum, basi subspathulato-contractum, apice convexum, c. 0.8—0.85 cm. longum, 0.3 cm. latum. Sepala lateralia divaricata, margine antico $^2/_5$ partibus inferioribus recurva superne incurva, oblique elliptica, acuta vel subacuta, basi contracta, margine postico rotundata, margine antico infra medium obtusangula, costa media dorso incrassata, 0.75—0.85 cm. longa, 0.38 cm. lata. Petala oblique spathulata, lamina oblongo-subelliptica, acuta vel obtusa, c. 0.775 cm. longa, 0.25—0.27 cm. lata. Labellum basi lata pedi gynostemii insertum, saccatum, 3lobum, lobis extus papillosis, dilute flavum, omnino cinnamomeo-maculatum, ab apice lobi intermedii usque ad apicem ovarii fere 0.6 cm. longum, ab apice loborum lateralium usque ad apicem sacci bene 0.7 cm. metiens, explanatum c. 0.7 cm. longum, 0.9 cm. latum, callo transverso quadrangulo truncato postice piloso apice macula cinnamomea ornata in pariete antico in flexu; lobi laterales erecti, late oblique trianguli, obtusi, margine postico rotundati, margine antico recti, margine antico et intus antice pilis longis clavatis albis villosi, basin versus parce pilosi; lobus intermedius satis conspicuus, porrectus, cum calcari angulum obtusum rotundatum faciens, supra visus triangulus, apice calloso-productus, obtusus, concavus, subtus convexus, margine et intus pilis clavatis breviusculis villosus, crassiusculus, explantus lobos laterales superans, c. 0.175 cm. longus, 0.5 cm. latus; calcar vix incurvulum, leviter a dorso compressum, truncatum, leviter retusum, fascia lata longitudinali pilorum clavatorum medianorum fuscorum exteriorum albidorum intus in pariete antico, usque ad apicem pedis gynostemii c. 0.27 cm., cum pede gynostemii c. 0.45 cm. longum. Gynostemium rectum, dorso convexum, subtus concavum, supra visum triangulum, album, infra stigma brunneo-maculatum, c. 0.2 cm. longum, apice obtuso, emarginato, auriculis incurvis, acute dentiformibus. Anthera cucullata, transverse rotundato-quadrangula, acute apiculata, alba, connectivo leviter costulato, c. 0.1 cm. lata. Pollinia 4, inaequimagna, oblique ovalia, rotundato-obtusa, albida, cum stipite brevi lato basi transverse plicato apice breviter libero obtuso albo et glandula semilunata c. 0.08 cm. longa. Rostellum brevissimum, leviter excisum, brevissime late obtuse bidentatum. Stigma altius excavatum, transverse oblongum. Pes gynostemii cum ovario angulum rectum faciens, latus, quadrangulus, truncatus, concavus, flavescens, brunneo-maculatus, fere 0.2 cm. longus. Ovarium teres, 6sulcatum, pallide viride, c. 0.5 cm. longum. Fructus elongatus, 6angulatus, costis 3 satis angustis truncatis, costis 3 latis convexo-rotundatis costula humili truncata instructis, apice

breviter crasse rostratus, basi crasse pedicellato-contractus, dilute viridis, maturitate flavescens, totus c. 4.7—5 cm. longus, rostro c. 0.2 cm., pedicello 0.25 cm. longo, 0.3—0.35 cm. diam., rima 1 longitudinali dehiscens.

Java: Priangan, Tjiandjoer, Tjidadap bei Tjibeber in c. 1000 m ü. d.M., auf Theesträuchern, viel. (W. F. WINCKEL, kult. unter n. 37; auch kult. in Hort. J. J. SMITH; R. C. BAKHUIZEN VAN DEN BRINK n. 984, bl. im März und September 1916). Soekaboemi, Pasawahan. (R. C. BAKHUIZEN VAN DEN BRINK, 1918, leb. Pfl., kult. in Hort. J. J. SMITH). Ebenda, Bodjong Lopang. (R. C. BAKHUIZEN VAN DEN BRINK, leb. Pfl., kult, in Hort. J. J. SMITH).

Diese Art sieht äusserlich *Th. acutilobum* J. J. S. am ähnlichsten, hat jedoch etwas mehr abstehende Brakteen. Die Blüten sind aber verschieden. Das Labellum ist eben so wie bei *Th. squarrosum* J. J. S. völlig gefleckt.

Thrixspermum patens J. J. S.

Stengel dünn, auf dem Querschnitt elliptisch, c. 7.5—15 cm lang, die Internodien 0.5—0.7 cm lang. Blätter abstehend oder ziemlich weit abstehend, linear, schwach zurückgebogen, an der Spitze mehr oder weniger ungleich stumpf oder spitz 2lappig mit unregelmässig berandeten Läppchen, nur an der Spitze etwas gekielt, dünnfleischig, mattgrün, meistens mehr oder weniger violett gefleckt, c. 3.2—5 cm lang, 0.6—0.8 cm breit; Scheiden den Internodien nahezu gleich lang. Blütenstände alleinstehend, die Scheide hinten am Grunde durchbohrend, abstehend, an der Spitze dicht vielblütig; Pedunculus fadenförmig, an der Spitze allmählich verdickt, violett punktiert, c. 3—13 cm lang; Rachis verdickt, bis c. 2.5 cm lang, mit den Brakteen 0.6—0.8 cm im Durchmesser. Brakteen allseitswendig, abstehend, aus breiter, die Rachis halbumfassender, konkaver Basis pfriemlich, dick gekielt, 0.35—0.5 cm lang. Blüten in Zwischenräumen blühend, eintägig, zart, schwach riechend, blassgelblich, c. 1.4 cm breit, die Sepalen weit abstehend, die Petalen mehr oder weniger zurückgeschlagen, elliptisch. Unpaares Sepalum länglich elliptisch, stumpf, an der Basis zusammengezogen, 0.85 cm lang, 0.3 cm breit. Paarige Sepalen schief elliptisch, spitz oder spitzlich, der Vorderrand stumpfwinkelig, mit aussen verdickter Mittelrippe, 0.75—0.85 cm lang, 0.38 cm breit. Petalen schief spatelig, spitz oder stumpf, 0.775 cm lang, 0.25—0.27 cm breit. Lippe sackig, 3lappig, in der Mitte stumpfwinkelig umgebogen, hellgelb, ganz braun gefleckt, innen mit einem rechtwinkeligen, abgestutzten Quercallus, vom Mittellappen bis zur Ovariumspitze nahezu 0.6 cm, von den Seitenlappen bis zur Spornspitze 0.7 cm messend, ausgespreizt 0.7 cm lang, 0.9 cm breit; Seitenlappen aufrecht, dreieckig, stumpf, innen besonders nach vorne lang weiss keulig behaart; Mittellappen ziemlich gross, vorgestreckt, dreieckig, stumpf, konkav, unten konvex, innen dicht und ziemlich kurz keulig behaart, ausgespreizt etwas länger als die Seitenlappen, 0.175 cm lang, 0.5 cm breit; Sporn kaum etwas eingebogen, sackig, abgestutzt, schwach eingedrückt, innen auf der

Vorderwand mit einem behaarten Längsstreifen, mit dem Säulenfuss 0.45 cm lang. Säule weiss, unterhalb der Narbe braun gefleckt, 0.2 cm lang; Öhrchen kurz zahnförmig, Anthere kappig, quer viereckig, mit einem kurzen Spitzchen, weiss, 0.1 cm breit. Pollinien 4, ungleich gross, schief oval, stumpf, weisslich mit dem kurzen, breiten, an der Spitze kurz freien, stumpfen Stielchen und der halbmondförmigen Klebmasse 0.08 cm lang. Rostellum sehr kurz. Narbe quer länglich. Säulenfuss mit dem Ovarium einen rechten Winkel bildend, viereckig, konkav, braun gefleckt, nahezu 0 2 cm lang. Ovarium 6furchig, blassgrün, 0.5 cm lang. Frucht verlängert, mit 3 breiten, konvexen, mit einer Rippe versehenen und 3 ziemlich schmalen, auf dem Rücken flachen Längsrippen, kurz und dick geschnabelt, an der Basis kurz und dick zusammengezogen, hellgrün, später gelblich, 4.7—5 cm lang, 0.3—0.35 cm im Durchmesser, mit einer Längsspalte aufspringend.

* **Thrixspermum trichoglottis** O. K. Rev. gen. pl. II (1891), 682.— *Dendrocolla trichoglottis* RIDL. in Journ. Linn. Soc. XXXII (1896), 381; in Mat. Fl. Mal. Penins. I (1907), 185. *Sarcochilus trichoglottis* HOOK. F. Fl. Br. Ind. VI (1890), 39; Ic. Pl. XXII (1894), t. 2123.

Caulis rigidus, compressus, pallide viridis, ad c. 13 cm. longus, 0.25 cm. latus, internodiis c. 0.6—1.2 cm. longis, radicibus in internodiis solitariis, e medio internodii supra inflorescentiam orientibus, patentissimis, tenuiusculis. Folia patentia, subrecta, subplana, oblonga ad oblongo-loriformia, apice lato plus minusve inaequaliter bilobata, lobis rotundatis vel obtusis, basi paulum angustata et conduplicata, costa media supra sulcata subtus leviter obtuse prominente, carnosula, dilutius viridia, opaca, c. 3.5—5.75 cm. longa, 1.3—2 cm. lata, vaginae tubulosae, compressae, sectione transversa ellipticae, opacae, dilute virides, interdum purpureo-suffusae, internodia aequantes, c. 0.3—0.425 cm. latae. Inflorescentiae vaginam dorso infra radicem perforantes, patentissimae, foliis aequilongae vel breviores, validiusculae, apice congeste pluriflorae, pedunculo tereti, apice incrassato, nitidulo, dilute viridi, c. 1.6—6.1 cm. longo, 0.1 ad fere 0.2 cm. diam., apice c. 0 2 ad bene 0.3 cm. diam., dimidio inferiore vaginulis c. 3 brevibus tubulosis donato, rachide incrassata, brevi, dilute viridi, ad 0.9 cm. longa. Bracteae quaquaversae, adpressae, e basi triangulo-dilatata leviter concava crassiuscule subulatae, trigonae, acutae, dilute virides, c. 0.5 cm. longae. Flores intervallis singuli vel perpauci florentes, ephemeri, valde aperti, odorati, c. 1.75 cm. lati, sepalis petalisque pallide flavescentibus. Sepalum dorsale oblongo-ellipticum, apice recurvulo convexo angustatum, obtusum, basi subcontractum, leviter concavum, c. 1 cm. longum, 0.4 cm latum. Sepala lateralia patentissima, valde obliqua, ambitu leviter sigmoideo-elliptica, superne recurvula, apicem versus angustata, obtusa, crassiuscule conico-apiculata, costa media dorso prominente, fere 1 cm. longa, 0.45 cm. lata. Petala patentissima, apice recurvula, e basi unguiculato-contracta oblique angulato-oblonga, obtusa, leviter concava, dorso convexa, c. 0.9 cm. longa, 0 275 cm. lata. Labellum basi lata pedi gynostemii insertum, saccatum, 3lobum, dilute flavum, ab apice lobi intermedii usque ad apicem ovarii c. 0.56 cm. longum, ab apice loborum lateralium usque ad apicem calcaris (absque pilis) c. 0.7 cm. metiens, explanatum c. 0.6 cm longum, 0.83 cm. latum, callo transverso brevissimo aequilateraliter trapeziformi truncato interdum apiculato marginibus flavescentibus exceptis flavo-aurantiaco in medio; lobi laterales erecti, apice recurvuli, convexi, lati, oblique quadranguli, obtusi, margine postico rotundati, intus extus et margine pilis longis clavatis patentissimis villosi, extus longitudinaliter dilute flavo-cinnamomee striati; lobus intermedius porrectus, cum calcari angulum obtusum faciens, supra visus rectangule triangulus, apice subtus in callum conicum porrectum productus, concavus, carnosus, intus papillosus, margine pilis brevibus clavatis ciliatus, extus minute dilute flavo-cinnamomee maculatus, explanatus lobos laterales aequans, c. 0.1 cm. longus, 0.225 cm. latus; calcar saccatum, cum ovario angulum subrectum faciens, rectum, subcylindricum, apice truncato-rotundatum, fascia longitudinali dense farinaceo-villosa intus a callo usque ad apicem calcaris decurrente et utrinque pilis clavatis villosum, extus glabrum, macula flavo-aurantiaca intus ad apicem, usque ad apicem pedis gynostemii c. 0.26 cm., cum pede gynostemii c. 0.4 cm. longum. Gynostemium breve, crassum, dorso convexum, cum pede a latere visum triangulum, apice oblique truncatum, album, c. 0.25 cm. longum, clinandrio apice leviter producto et truncato-bidentato, auriculis parvis, acute dentiformibus. Anthera cucullata, quadrangulo-orbicularis, apice truncata, medio recurvula spurie retusa, tenuis, alba, c. 0.1 cm. lata. Pollinia 4, inaequalia, geminata, flavescentia, majora oblique oblongo-subovalia, curvula, antice convexa, apice obtusa, basi truncata, c. 0.07 cm. longa, postica bene minora, triangula, cum majora sectione transversa trigona, stipite cum glandula indistincto. Rostellum indistinctum. Stigma alte excavatum, transversum. Pes gynostemii cum ovario angulum obtusum subrectum faciens, rectus, transverse quadrangulus, concavus, carnosus, albus, macula transversa dilute purpurea, bene 0.2 cm. latus. Ovarium tenue, 6sulcatum, pallide virescens, c. 0.55 cm. longum. Fructus patentissimus, elongatus, rectus, tenuis, 6angulatus, apice breviter rostrato-contractus, basi breviter et crasse contractus, dilute viridis, deinde flavescens, ad c. 11 cm. longus, 0.4—0.425 cm. diam., rima 1 longitudinali dehiscens.

Java: Buitenzorg, Tjimoelang, in c. 200 m ü. d. M., an Kaffeebäumen. (J. J. SMITH, bl. im April 1905). Ebenda, an Bäumen, viele Exemplare. (KARTAMAH, bl. und fr. im Januar 1920). Ebenda im Cultuurtuin. (KARTAMAH, steriel im September 1920).

Sumatra: Westküste, Pajokoemboeh, Schlucht von Harau, an Kaffee- und Rambae-bäumen. (E. JACOBSON, kult. unter n. 796).

Singapore. (leb. Pfl. kult. in Hort. J. J. SMITH). Nach RIDLEY auch Malaiische Halbinsel und Borneo.

Wie aus den obenstehenden Notizen hervorgeht, hat die Art ein ziemlich grosses Verbreitungsgebiet; sie scheint nur wenig variabel zu sein. Ausser den javanischen Exemplaren hatte ich die Verfügung über mir freundlichst vom Botanischen Garten in Singapore zugeschickten lebenden Pflanzen und

von West-Sumatra stammendes Alkoholmaterial, dem Herr E. JACOBSON eine ausführliche Beschreibung der Färbung beilegte.

Die Art ist leicht kenntlich an den verhältnismässig breiten, hellgrünen Blättern, stets kurzen Blütenständen mit aufrechten Brakteen und blassgelblichen Blüten, und einem im oberen Teile dunkler gelb oder bräunlich gelb punktierten Labellum.

Bei den Exemplargn von Singapore zeigten die meisten untersuchten Blüten eine merkwürdige Umbildung, die ich auch bei dem sumatranischen Material antraf, aber noch nicht richtig zu erklären weiss. An der Stelle des Rostellums fand sich eine grosse, abgerundet 2lappige, abwärts gewandte Quermembran, die das Stigma zum grössten Teile überdeckte. Unterhalb dieser Membran, also an der dem Stigma zugewandten Seite aber völlig frei von demselben, fanden sich 2 Pollinien mit einer Art von in zwei Schenkel gesteiltem Stielchen. Es macht den Eindrück als ob das Rostellum in eine Anthere umgebildet wäre.

Beschreibung nur nach Exemplaren von Buitenzorg.

Thrixspermum trichoglottis O. K.

Stengel steif, auf dem Querschnitt elliptisch, bis c. 13 cm lang, die Internodien 0.6 - 1.2 cm lang. Blätter abstehend, nahezu gerade und flach, länglich bis länglich riemenförmig, mit breiter, etwas ungleich 2lappiger Spitze, mit oben gefurchter, unten etwas vorragender Mittelrippe, etwas fleischig, hellgrün, matt, c. 3.5—5.75 cm lang, 1.3—2 cm breit; Scheiden zusammengedrückt, den Internodien gleich lang. Blütenstände die Scheide hinten durchbohrend, weit abstehend, den Blättern gleich lang oder kürzer, ziemlich kräftig, an der Spitze dicht mehrblütig; Pedunculus an der Spitze verdickt, hellgrün, c. 1.6—6.1 cm lang; Rachis verdickt, bis c. 0.9 cm lang. Brakteen allseitswendig, anliegend, aus dreieckig verbreiterter Basis ziemlich dick pfriemlich, dreseitig, spitz, c, 0.5 cm lang. Blüten in Zwischenräumen blühend, eintägig, zart, riechend, weit geöffnet, c. 1.75 cm breit, mit blassgelblichen Sepalen und Petalen. Unpaares Sepalum länglich elliptisch, stumpf, an der Basis etwas zusammengezogen, c. 1 cm lang, 0.4 cm breit. Paarige Sepalen schief elliptisch, gegen die Spitze verschmälert, stumpf, mit einem Spitzchen, mit aussen vorragender Mittelrippe, fast 1 cm lang, 0.45 cm breit. Petalen aus nagelförmig zusammengezogener Basis schief länglich, stumpf, 0.9 cm lang, 0.275 cm breit. Lippe sackig, 3lappig, in $^2/_3$ unterhalb der Spize stumpfwinkelig gebogen, in der Mitte mit einem sehr kurzen, abgestutzten Quercallus, hellgelb, die Seitenlappen aussen hellgelbbraun gestreift, der Mittellappen aussen hellgelbbraun punktiert, innen in der Mitte und an der Spornspitze mit einem orangegelben Fleck, vom Mittellappen bis zur Ovariumspitze 0.56 cm, von den Seitenlappen bis zur Spornspitze 0.7 cm lang, ausgespreizt 0.6 cm lang, 0.83 cm breit; Seitenlappen aufrecht, mit auswärts gebogener Spitze, konvex, breit schief viereckig, stumpf, innen aussen und am Rande mit langen, keulenförmigen Haaren; Mittellappen vorgestreckt, von oben gesehen rechtwinkelig dreieckig, konkav, unten an der Spitze mit einem kurzen, kegeligen Callus, am Rande mit kurzen, keuligen Haaren, ausgespreizt den Seitenlappen gleich lang, 0,1 cm lang, 0,225 cm breit; Sporn sackig, mit dem Fruchtknoten einen nahezu geraden Winkel bildend, gerade, fast zylindrisch, abgerundet abgestutzt, innen auf der Vorderwand mit einem mehlartig zottigen Längsbande und beiderseits davon keulig behaart, bis zur Ovariumspitze c. 0.4 cm lang. Säule kurz, dick, weiss, c. 0.25 cm lang; Öhrchen klein, zahnförmig. Anthere kappig, rundlich vierkant, weiss, 0.1 cm breit. Pollinien 4, ungleich gross, ungefähr schief länglich oval, stumpf, gelblich, c. 0.07 cm lang, die hinteren kleiner und dreieckig; Stielchen, Klebmasse wie auch das Rostellum undeutlich. Narbe quer. Säulenfuss kurz, viereckig, konkav, mit einem hellpurpurnen Querflecken. Ovarium blassgrünlich, c. 0.55 cm lang. Frucht verlängert, dünn, gerade, 6kantig, hellgrün, dann gelblich, c. 11 cm lang, 0.4—0.425 cm im Durchmesser, mit einer Längsspalte aufspringend.

Thrixspermum pensile SCHLTR in ENGL. Bot. Jahrb. XLV, Beibl. n. 104 (1911), 59.

Caulis elongatus, directe pensilis, valde compressus, ad c. 1 m. longus, basi tantum radicans, internodiis c. 1.5—2.5 cm. longis. Folia subpatentissima, oblonga ad breviter lorata, apice abrupte triangulo-contracta, basi lata utrinque rotundata subconduplicato-concava caulem partim amplectentia, supra in utraque parte costae mediae supra canaliculatae subtus praesertim basin versus carinatae convexa, carnoso-coriacea, c 6 5 –7.5 cm. longa, 1.5—2.5 cm. lata, apice contracto c. 0.5 –0.65 cm. longo; vaginae inferne tubulosae, superne antice fissae, valde a latere compressae, internodia superantes, c. 0.8—0.85 cm. latae. Inflorescentiae vaginam dorso ad basin perforantes, fasciculatae, longitudinatiter biseriales, ad c. 4, patentissimae, brevissimae, pauciflorae, pedunculo tereti, c. 0.65—1.3 cm. longo, nonnullis vaginulis brevibus tubulosis rugulosis donato, rachide abbreviata, c. 0.35 cm. longa. Bracteae patentes, breviter triangulae, obtusae, concavae, carinatae, rugulosae, c. 0.1 cm. longae. Flores pauci simultanee florentes, mediocres. Sepalum dorsale subobovato-oblongum, obtusissimum, concavum, 5nervium, c. 0.9 cm. longum, 0.45 cm. latum. Sepala lateralia breviter ad pedem gynostemii decurrentia, subelliptica, obtusissima, concava, dorso apicem versus carinata, 5nervia, c. 0.9 cm. longa, 0.53 cm. lata. Petala oblique oblongo-obovata, oblique rotundata, basi leviter contracta, concava, 3- supra basin 5nervia, c 0.8 cm. longa, 0.4 cm , basi 0.175 cm. lata. Labellum basi concavum vix rotundato-saccatum, sacco antice viso late rotundatum, callo transverso erecto antice viso aequilateraliter trapeziformi glabro intus in flexu ad basin lobi intermedii, costula longitudinali papilloso-puberula in sacco, inexplanatum ab apice ovario ad apicem lobi intermedii c. 0.55 cm., ab apice loborum lateralium usque ad apicem sacci 0.6 cm. metiens, 0.34 cm. latum, explanatum ambitu suborbiculare, c. 0.65 cm. latum, 0.7 cm. longum; lobi laterales erecti, apice incurvuli, late falcato-trianguli, acuti, margine postico rotundati, gynostemium superantes; lobus intermedius satis conspicuus, porrectus, calliformis, cum sacco angulum obtusum faciens, carnosus, a latere visus obtuse conicus, supra visus late rotundatus, margine transverso elevatulo retuso ad basin lobi intermedii. Gynostemium breve, dorso convexum, c 0.16 cm., absque anthera 0.1 cm. longum, clinandrio concavo Anthera cucullata, suborbicularis, apice paululum producta, minute retusa cum apiculo minimo in sinu, tenuis, connectivo basi vix incrassato, c. 0.14 cm. lata. Pollinia 4, haud valde inaequalia, oblique oblonga, obtusa, antice convexa, c. 0.1 cm. longa, stipite parvo convexo tenui apice libero, glandula parva, curvata. Stigma parvum, alte excavatum. Pes gynostemii cum ovario angulum obtusum faciens, incurvulus, oblongus basi angustatus, concavus, bene 0.4 cm. longus. Ovarium 6sulcatum, c. 1 cm. longum.

Java: Buitenzorg, Nirmala, in 1100 m ü. d. M., im Walde auf einem Bergrücken. (C. A. BACKER n. 11170, im Dezember 1913, steriel).

Priangan, Soekaboemi, auf dem Gede. (M. FLEISCHER n. 30, im September 1911, steriel). Tjiandjoer, Tjibeber, Tjadas Malang in 1000 m ü. d. M. (W. F. WINCKEL, kult. sub. n. 329).

Kediri, auf dem Goenoeng Wilis, in 1200 m ü. d. M., im Urwalde, nicht selten, in langen Guirlanden von den Bäumen herabhängend. (C. A. BACKER n. 11484, fr. im Februar 1914).

Sumatra: Padangsche Bovenlanden, Fort de Kock in c. 1000 m ü. d. M. (R. SCHLECHTER n 15928, bl. im März 1907). Padangsche Benedenlanden, Loeboek Sikaping. (E. JACOBSON, kult. sub. n 1766).

Wiewohl die meisten oben erwähnten, javanischen Exemplare blütenlos sind und in der Länge und Blätter ziemlich variieren, zweifle ich kaum daran, dass sie zusammengehören. Das untersuchte javanische und sumatranische Material stimmt in den Blütencharakteren vorzüglich überein.

Die Beschreibung von *Th. pensile* SCHLTR. enthält jedoch einige Ungenauigkeiten; so wird der Quercallus der Lippe nicht erwähnt, und der pfriemliche Callus am Grunde der Lippe ist in Wirklichkeit, wie bei allen verwandten Arten, eine papillöse Längsrippe.

Vor den anderen nächstverwandten Arten ist *Th. pensile* SCHLTR. ausgezeichnet durch die völlig geradeaus schlaff herunterhängenden Stengel, die am Grunde nicht stielförmig zusammengezogenen Blätter und die auf der Lippe mit einem ungeteilten Callus versehenen Blüten.

Die Sektion *Katokolla* ist überhaupt nicht scharf gegenüber *Dendrocolla* unterschieden Die von SCHLECHTER gegebenen Merkmale sind nur graduell und kommen auch mehr oder weiniger bei den anderen Sektionen vor. Sie wäre am Besten mit *Dendrocolla* zu vereinigen.

Beschreibung nach Herbar und in Alkohol aufbewahrtem javanischem Material. (WINCKEL n. 329).

Thrixspermum pensile SCHLTR.

Stengel bis zur Spitze schlaff herunterhängend, stark zusammengedrückt, nur am Grunde wurzelnd, die Internodien 1.5—2.5 cm lang. Blätter ziemlich weit abstehend, sitzend, länglich riemenförmig, abgebrochen dreieckig zusammengezogen an der Spitze, mit breiter, eckig konkaver Basis den Stengel z. T. umfassend, mit oben rinniger, unten gekielter Mittelrippe, fleischig ledrig, c. 6.5—7.5 cm lang, 1.5—2.5 cm breit; Scheiden röhrig, nach oben vorn gespalten, stark seitlich zusammengedrückt, 0.8—0.85 cm breit. Blütenstände bis 4 an den Knoten, 2reihig, weit abstehend, sehr kurz, wenigblütig; Pedunculus 0.65—1.3 cm lang, mit wenigen kurzen, röhrigen Schaftblättern; Rachis sehr kurz. Brakteen kurz dreieckig, stumpf, konkav, gekielt, runzelig, 0.1 cm lang. Blüten mittelgross Sepalen ungefähr länglich, sehr stumpf, konkav, c. 0.9 cm lang, 0.45—0.53 cm breit. Petalen schief länglich verkehrt eirund, abgerundet, am Grunde etwas verschmälert, konkav, c. 0.8 cm lang, 0.4 cm breit. Lippe am Grunde kaum sackig, unten abgerundet, mit einem aufrechten, ungeteilten, trapezienförmigen, innen auf der Bucht und nach unten mit einer papillösen Längsrippe, bis zur Ovariumspitze 0.55 cm, von den Seitenlappen bis zum Sack 0.62 cm messend; Seitenlappen aufrecht, breit sichelig dreieckig, spitz, am hinteren Rande stark abgerundet; Mittellappen vorgestreckt, callusförmig, von oben gesehen breit abgerundet, am Grunde mit einem schwach erhabenen, eingedrückten Querrand. Säule 0.16 cm lang; Clinandrium konkav. Anthere ungefähr rund, an der Spitze etwas vorgezogen, schwach eingedrückt und mit einem sehr kleinen Spitzchen, 0.14 cm breit. Pollinien 4, nicht sehr ungleich gross, schief länglich, stumpf. Säulenfuss mit dem Ovarium einen stumpfen Winkel darstellend, seicht eingebogen, länglich, am Grunde verschmälert, konkav, 0.4 cm lang. Ovarium 1 cm lang.

***Taeniophyllum Reijnvaaniae** J. J. S. n. sp.

Pusillum. Caulis abbreviatus, gemma squamata. Radices elongatae, cortici adpressae, subteretes, subtus tantum applanatae, c. 0.06—0.1 cm. latae, apice gemmam adventivam emittentes. Inflorescentiae laxe pluriflorae, pedunculo filiformi, pallide viridi, nonnullis vaginulis bracteiformibus donato, c. 0.3—0.6 cm. longo, rachide filiformi, flexuosa, pallide viridi, c. 0.6—1.4 cm. longa, internodiis c. 0.15—0.3 cm. longis. Bracteae alternatim bifariae, patentes, pedicello adpressae, rachidem semiamplectentes, triangulae, concavae, pallide virides, c. 0.05—0.06 cm. longae. Flores ad c. 10, minimi, intervallis aperti, pallide virescentes, toti c. 0.25 cm. longi, sepalis petalisque usque ad medium in tubum subtus fissum connatis, parallelis, apice vix divergentibus, omnibus 1nerviis. Sepala explanata c. 0.18 cm. longa, parte libera oblongo-triangula, satis acuta, leviter concava, c. 0.08 cm. longa, bene 0.03 cm. lata, lateralia obliqua. Petala quam sepala breviora, bene 0.15 cm. longa, parte libera oblique ovato-triangula, subacuminata, acuta, leviter concava, fere c. 0.06 cm. longa. Labellum sepalis petalisque parallelum, calcaratum, simplex, oblongo-triangulum, apice leviter contractum et breviter hamato-incurvum, acutum sed non setiferum, concavum, basi canaliculatum, fauce calcaris utrinque incrassatione coarctata, subtus convexum, 3nervium, explanatum absque calcari c. 0.14 cm. longum, 0.06 cm. latum; calcar reversum, ovario parallelum, cum lamina angulum obtusum faciens, subrectum, a dorso compressum, semiovale, obtusum, c. 0.07 cm.

longum. Gynostemium breve, latum, dorso convexum, c 0.03 cm. longum, apice late rotundatum, clinandrio conspicuo, concavo. brachiis stigmaticis porrectis, parallelis, verticalibus, cum clinandrio angulum acutum facientibus, oblique subrotundis, convexis, intus concavis, apicem gynostemii vix superantibus. Anthera cucullata, tenerrima, reniformis, apice brevissime bidentata, basi lobulis 2 instructa. Pollinia 4, inaequalia, 2 majora subpyriformia, subfalcatula, 2 minora oblique subovalia. Rostellum brachiis multo brevius, bipartitum, laciniis triangulis. Ovarium curvatum, 6sulcatum, c. 0.1 cm. longum. Fructus curvulus, subcylindricus, 9costatus, apice breviter conicus, reliquiis floris coronatus, basi obtusus, abrupte in pedicellum contractus, nitidulus, dilute viridis, minute furfuraceo-punctatus, c. 0.35—0.4 cm. longus, 0.15—0.175 cm. diam., rima 1 longitudinali dehiscens, pedicello tenui, c. 0.05 cm. longo.

Java: Bandoeng, in einem Dorfe, in c. 800 m ü. d. M. (C. C. REIJNVAAN, bl. und fr. im September 1918).

Eine sehr bemerkenswerte Pflanze, die durch Bildung junger Pflänzchen an der Spitze der Wurzeln an *T. proliferum* J. J. S. erinnert, jedoch mit diesem Unterschied, dass bei dieser Art zuerst eine „Keimpflanze" entsteht, die sich auch weiter wie eine Keimpflanze benehmt, während bei *T. Reijnvaaniae* sofort eine Knospe gebildet wird, die Wurzeln und Blütenstände treibt. Im Übrigen sind die beiden Arten aber sehr verschieden. Die Borste an der Spitze der Lippe ist zu einem kurzen, spitzen, hakig aufwärts gekrümmten Zahn reduziert.

Dr. W. M. DOCTERS VAN LEEUWEN untersuchte genauer die vegetative Vermehrungsweise dieser Art. (Ann. Jard. Bot Buit. XXXI (1920), 53).

Die Beschreibung wurde angefertigt nach von Fräulein C. C. REIJNVAAN bei Bandoeng gesammelten, und im Garten des Herrn W. M. DOCTERS VAN LEEUWEN und in meinem eigenen Garten zur Blüte gelangten Exemplaren.

Taeniophyllum Reijnvaaniae J. J. S.

Kleine Pflanze. Wurzeln verlängert, der Rinde anliegend, fast stielrund, nur an der Unterseite abgeflacht, c. 0.06—0.1 cm breit, an der Spitze eine Adventivknospe bildend Blütenstände locker mehrblütig; Pedunculus fadenförmig, blassgrün, mit wenigen brakteeartigen Schaftblättern, c. 0.3—0.6 cm lang; Rachis fadenförmig, zickzackig, blassgrün, c. 0.6—1.4 cm lang, die Internodien c. 0.15—0.3 cm lang. Brakteen 2zeilig, abstehend, die Rachis halbumfassend, dreieckig, konkav, blassgrün, c. 0.05—0.06 cm lang. Blüten bis c. 10, sehr klein, in Zwischenräumen blühend, blassgrünlich, c. 0.25 cm lang, die Sepalen und Petalen bis zur Mitte zu einer unten gespaltenen Röhre verwachsen, parallel, 1nervig. Sepalen im ganzen c. 0.18 cm lang, der freie Teil länglich dreieckig, ziemlich spitz, schwach konkav, c. 0.08 cm lang, gut 0.03 cm breit, die paarigen schief. Petalen kürzer als die Sepalen, gut 0.15 cm lang, der freie Teil schief eirund dreieckig, etwas zugespitzt, spitz, schwach konkav, fast 0.06 cm lang. Lippe den Sepalen und Petalen parallel, gespornt, ungeteilt, länglich dreieckig, an der Sptize etwas zusammengezogen und kurz hakig eingebogen, spitz aber ohne Borste, konkav, nach der Basis rinnig, am Grunde beiderseits mit einer den Sporneingang verengernden Verdickung, unten konvex, 3nervig, ausgespreizt ohne Sporn c. 0.14 cm lang, 0.06 cm breit; Sporn zurückgerichtet, dem Ovarium parallel, mit der Spreite einen stumpfen Winkel bildend, nahezu gerade, vom Rücken zusammengedrückt, halboval, stumpf, c. 0.07 cm lang. Säule kurz, breit, mit konvexem Rücken, c. 0.03 cm lang, an der Spitze breit abgerundet; Clinandrium-ziemlich gross, konkav; Narbenärmchen vorgestreckt, parallel, vertikal, mit dem Clinandrium einen spitzen Winkel bildend, schief rundlich, aussen konvex, innen konkav, die Säulenspitze kaum überragend. Anthere kappig, nierenförmig, an der Spitze sehr kurz 2zähnig, an der Basis mit 2 Läppchen Pollinien 4, ungleich, die 2 grössten ungefähr birnförmig, etwas sichelig, die 2 kleinsten schief oval. Rostellum viel kürzer als die Säulenärmchen, 2teilig, die Lazinien dreieckig. Ovarium 6furchig, c. 0.1 cm lang. Frucht etwas gekrümmt, zylindrisch, 6kantig, 9rippig, mit kurz kegeliger Spitze, von den Blütenresten gekrönt, an der Basis stumpf, plötzlich in das Stielchen zusammengezogen, schwach glänzend hellgrün, fein kleiig punktiert, c. 0.35—0.5 cm lang, 0.15—0.175 cm dick, mit einem Längsriss aufspringend; Stielchen dünn, c, 0.05 cm lang.

* **Taeniophyllum mamilliferum** J. J. S. n. sp.

Planta pusilla, radicibus paucis, substrato adpressis, elongatis, a dorso compressis, convexis, apice pallide viridibus, ad c. 9.5 cm. longis, 0.15—0.22 cm. latis, apice plantulam nascentibus. Inflorescentiae patentes, laxius pluriflorae, pedunculo filiformi, papilloso, dilute viridi, c. 0.2—0.9 cm. longo, vaginulis c 2 parvis superne conduplicatis carinatisque donato, rachide crassiore, flexuosa. lateraliter compresso-quadrangula, papillosa, dilute viridi, c. 0.4 cm. longa, internodiis c. 0.06 cm, longis. Bracteae alternatim bifariae, patentes, pedicello adpressae, triangulae, acutae, concavae, pallide virides, c. 0.05 cm, longae. Flores c. 8, intervallis singuli florentes, parvi, pallide virides, deinde flavescentes, toti c. 0.34 cm. longi, sepalis petalisque tertia parte inferiore in tubum subtus fissum connatis, parallelis, apice vix divergentibus, omnibus 1nerviis, explanatis laminam c. 0.3 cm. longam 0.25 cm. latam facientibus. Sepala tota c. 0.3 cm. longa, dorso parce verruculosa, parte libera lanceolato-triangula, concava, subacuta, c. 0.2 cm. longa, 0.07 cm. lata. Petala similia, acuta, parte libera c. 0.18 cm longa, 0.075 cm. lata. Labellum sepalis petalisque parallelum, breviter calcaratum, simplex, vix sigmoideum, concavum, subtus convexum, lanceolato-triangulum, basi utrinque rotundato-dilatatum et margine incurvum, apice in subulam recurvulam c, 0.075 cm, longam basi supra subula recta reversa instructam acuminatum, basi excavatum, membrana transversa reversa bilobula excavationis apicem obtegente, utrinque in labelli basin dilatatam decurrente, 5nervium, nervo intermedio usque ad apicem producta, nervis 2 exterioribus medium laminae fere attingentibus, ceteris brevissimis, cum calcari c. 0.325 cm. longum; calcar reversum, breve, crassum, mamilliforme, apice brevissime obtuse contractum, intus eglandulosum, dorso c. 0.06 cm. longum, fauce membrana transversa obliqua supra excepta circumnexa longitudinaliter biplicata biloba cum lobulo brevi interposito clausum. Gynostemium brevissimum, dorso convexum, cum brachiis stigmaticis fere 0.1 cm. longum, clinandrio magno, alte excavato, oblique cyathiformi. Anthera cucullata, transverse ovalis, subreniformis, didyma, apice truncata, lobulis 2 thecis minoribus ad basin, c. 0.05 cm. lata. Pollinia 4, oblique pyriformia, curvula, paulo inaequalia. Brachia stigmatica conspicua, porrecta, oblique oblonga, obtusa, antheram longe superantia. Ovarium pedicellatum teres, 6sulcatum, fere 0.2 cm. longum Capsula breviter pedicellata, curvula, oblonga, apice obtusa et brevissime contracta, flore marcido coronata, valde et late convexo-9costata, costis in facie convexa majoribus, c. 0.7 cm. longa, 0.23 cm. diam., basi in pedicellum c. 0.07 cm. longum contracta, rima 1 dehiscens.

Java: Priangan, Tjisalak, am Fusse, des Goenoeng Halimoen bei Paroengkoeda, in 500 m ü. d. M. (R. C. BAKHUIZEN VAN DEN BRINK, bl. im Juni 1920, auch leb. Pfl., kult. in Hort. J. J. SMITH).

Die Art ist habituell *T. Reynvaaniae* J. J. S. ähnlich, jedoch in allen Teilen grösser. Die Sepalen und Petalen sind nur im unteren Drittel verwachsen und die Lippe und Säule sind sehr verschieden gestaltet.

Taeniophyllum mamilliferum J. J. S.

Kleine Pflanze mit wenigen, angedrückten, verlängerten, konvexen, bis c. 9.5 cm. langen, 0.15—0.22 cm breiten Wurzeln. Blütenstände ziemlich locker mehrblütig; Pedunculus fadenförmig, papillös, hellgrün, c. 0.2—0.9 cm lang, mit c. 2 kleinen, nach oben hin zusammengelegten und gekielten Schaftblättern; Rachis etwas dicker, zickzackig, von der Seite zusammengedrückt vierkantig, papillös, hellgrün, c. 0.4 cm lang, die Internodien c. 0.06 cm lang. Brakteen zweizeilig, abstehend, dreieckig, spitz, konkav, blassgrün, c. 0.05 cm lang. Blüten c. 8, in Zwischenräumen einzeln geöffnet, klein, blassgrün, nachher gelblich, c. 0.34 cm lang, die Sepalen und Petalen im unteren Drittel zu einer unten gespaltenen Röhre verwachsen, parallel, kaum etwas divergierend, 1nervig, ausgespreizt zusammen ein c. 0.3 cm langes, 0.25 cm breites Ganze darstellend. Freier Teil der Sepalen lanzettlich dreieckig, ziemlich spitz, konkav, c. 0,2 cm lang, 0.07 cm breit. Petalen etwas kürzer als die Sepalen. Lippe kurz gespornt, einfach, konkav, lanzettlich dreieckig, am Grunde beiderseits abgerundet verbreitert und eingebogen, in eine etwas zurückgebogene, 0.075 cm lange, an der Basis oben mit einer geraden, zurückgerichteten Borste versehene Pfriemspitze zugespitzt, am Grunde mit einer Aushöhlung und einer zurückgerichteten, zweilappigen, die Aushöhlung für einen kleinen Teil überdeckenden, beiderseits auf die verbreiterte Basis der Lippe herablaufenden Quermembran, 5nervig, nur der Mittelnerv bis zur Spitze fortlaufend, mit dem Sporn c. 0.325 cm lang; Sporn zurückgerichtet, kurz, dick, zitzenförmig, an der Spitze sehr kurz und stumpf zusammengezogen, innen ohne Drüse, 0 06 cm lang, der Eingang von einer ausser an der oberen Seite ringsum angewachsenen, zweifaltigen, zweilap-

pigen und im Sinus mit einem kleinen Läppchen versehenen Quermembran verschlossen. Säule sehr kurz, mit den Narbenfortsätzen fast 0.1 cm lang; Clinandrium gross, tief becherförmig. Anthere kappig, queroval, ungefähr nierenförmig, gedoppelt, an der Spitze abgestutzt, am Grunde mit 2 Läppchen, c. 0.05 cm breit. Pollinien 4, schief birnförmig, schwach gekrümmt, etwas ungleich. Narbenfortsätze gross, vorgestreckt, schief länglich, stumpf, die Anthere weit überragend. Fruchtknoten mit dem Stielchen fast 0.2 cm lang. Frucht schwach gekrümmt, länglich, stark und ungleich 9rippig, c. 0.7 cm lang, 0.23 cm im Durchmesser, mit einer Längsspalte aufspringend. Stielchen c. 0.07 cm lang.

* **Taeniophyllum Doctersii** J. J. S. n. sp.

Planta parva, radicibus substrato adpressis, valde compressis, viridibus, ad c. 15 cm. longis, 0.275—0.3 cm. latis. Inflorescentiae valde multiflorae, diu flores gignentes, pedunculo filiformi, minutissime papilloso, pallide viridi, tenuissime transverse viridi-striolato, c. 0.6 cm longo, rachide paulo crassiore, angulata, papillosa, ad c. 2.2 cm. longa, internodiis c. 0.15—0.05 cm. longis. Bracteae alternatim bifariae, patentes, triangulae, conico-apiculatae, concavae, dorso convexae, dilute virides, apice obscuriores, ad c. 0.06 cm. longae. Flores intervallis singuli aperti, parvi, pallide flavo-virides, c. 0.37 cm. longi, sepalis petalisque superne divergentibus 0.225 cm. lati. Sepala petalaque fere dimidio inferiore in tubum subtus fissum connata. Sepala explanata tota c. 0.23—0.24 cm. longa, parte libera late ovata, obtusa, minutissime apiculata, leviter concava, c. 0.13 cm. longa, bene 0.1 cm. lata, lateralia paulo obliqua. Petala tota c. 0.23 cm. longa, parte libera orbiculari-ovata, apice angustata, acuta vel subobtusa, c. 0.125—0.13 cm. longa, bene 0.1 cm. lata. Labellum calcaratum, constrictione transversa obliqua utrinque inter calcar et laminam, pallide viride, totum fere 0.35 cm. longum; lamina porrecta, subtriloba, supra visa oblonga, apice leviter angustata, obtusa apice subtus in callum brevem obtusum producta, supra vix infra apicem appendicem brevem erectam recurvam transverse triangulo-subulatam irregularem (an semper?) acutam bene 0.03 cm. longam gerens, supra subplana superne leviter convexa, excavatione conspicua quadrangula explanata subsemiorbiculari margine anguste prominente et antice anguste excisa et lobulos rectangulos formante ad basin, subtus convexa, carnosula, c. 0.25 cm. longa, lobis lateralibus ad basin erectis, humilibus, leviter rotundatis; calcar reversum, ovario adpressum, oblique et crasse ovoideo-conicum, obtusum, fauce membrana transversa obliqua fere clausum, usque ad apicem ovarii c 0.12 cm., subtus 0.17 cm. longum, c. 0 14 cm. latum. Gynostemium breve, dorso convexum, dilute viride, absque anthera c. 0.04 cm., cum brachiis stigmaticis porrectis oblique linearibus obtusis albidis 0 07 cm. longum, clinandrio magno, concavo, apice rotundato. Anthera cucullata, subreniformis apice paulo angustato reverso sub thecis abscondito truncato, thecis globosis antice 2loba, lobulis 2 thecis minoribus semiglobosis convexis subtus excavatis ad basin, c. 0 05 cm. lata. Pollinia 4, ovalia, flava, cum stipite et glandula oblonga alba c. 0.1 cm. longa. Ovarium curvatum, teres, viride, c. 0.25 cm. longum.

Java: Buitenzorg, am Tjiapoes. (W. M. DOCTERS VAN LEEUWEN, leb. Pfl., Oktober 1919).

Unter den verwandten javanischen Arten besonders ausgezeichnet durch die breiten freien Teile der Sepalen and Petalen. Der Fortsatz an der Spitze der Lippe ist nicht genau pfriemlich aber mehr quer dreieckig, der Sporn dick kegelig eiförmig und die Säulenärmchen lang und dünn.

Beschreibung nach einer lebenden, von Herrn Dr. W. M. DOCTERS VAN LEEUWEN gesammelten und in meinem Garten zur Blüte gelangten Pflanze.

Taeniophyllum Doctersii J. J. S

Kleine Pflanze. Wurzeln fest angedrückt, stark zusammengedrückt, grün, c. 15 cm lang, 0.275—0.3 cm breit. Blütenstände vielblütig, lange fortblühend; Pedunculus fadenförmig, sehr klein papillös, grün, c. 0.6 cm lang; Rachis etwas dicker, kantig, papillös, bis 2.2 cm lang; Internodien 0.15—0.05 cm lang. Brakteen 2zeilig, abstehend, dreieckig, mit einem kegeligen Spitzchen, konkav, bis 0.06 cm lang. Blüten in Zwischenräumen einzeln geöffnet, blass gelblichgrün, c. 0.37 cm lang, 0.225 cm breit. Sepalen und Petalen fast bis zür Mitte verwachsen. Sepalen ausgespreizt im ganzen c. 0.23—0.24 cm lang, die freien Teile breit eirund, stumpf, 0.13 cm lang, gut 0.1 cm breit. Petalen im ganzen 0.23 cm lang, der freie Teil rund-eirund, an der Spitze verschmälert, spitz oder stumpflich, 0.125—0.13 cm lang, gut 0.1 cm breit. Lippe gespornt, beiderseits mit einer schiefen Einschnürung zwischen Sporn und Platte, blassgrün, im ganzen fast 0.35 cm lang; Platte schwach 3lappig, länglich, stumpf mit einem kurzen, stumpfen Callus unten an der Spitze und einem kurzen, aufrechten, zurückgebogenen, pfriemlich-dreieckigen, spitzen Anhängsel oben etwas unterhalb der Spitze, am Grunde mit einer bedeutenden, ungefähr viereckigen, mit einem schmalen, vorspringenden, vorn schmal ausgeschnittenen Rande versehenen Aushöhlung, unten konvex, c. 0.25 cm lang, die Seitenlappen aufrecht, kurz, schwach abgerundet; Sporn zurückgerichtet, dem Ovarium anliegend, dick und schief kegelig eiförmig, stumpf, am Eingang von einer Quermembran verschlossen, bis zur Ovariumspitze c. 0.12 cm lang, 0.14 cm breit. Säule kurz, hellgrün, ohne Anthere c. 0.04 cm lang, bis zur Spitze der vorragenden, linearen, dünnen, weisslichen Säulenärmchen c. 0.07 cm lang; Clinandrium gross, an der Spitze abgerundet. Anthere kappig, nahezu nierenförmig, mit etwas verschmälerter, abgestutzter, zurückgerichteter, unter den Theken versteckter Spitze, durch die kugeligen Theken vorn 2lappig, mit 2 kleineren, halbkugeligen, ausgehöhlten Läppchen an der Basis, c. 0.05 cm breit. Pollinien 4, oval, gelb, mit dem länglichen Stielchen und Klebmasse c. 0.1 cm lang. Ovarium grün, c. 0.25 cm lang.

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